RAILROAD GAZETTE

FRIDAY, AUGUST 17, 1877.

Tests of Rail Joints.

The St. Louis Bolt & Iron Company has recently had some experiments made, by Messrs. Flad & Pfeifer, to test the strength of Bessemer steel rail splices, which will be of interest to many of our readers.

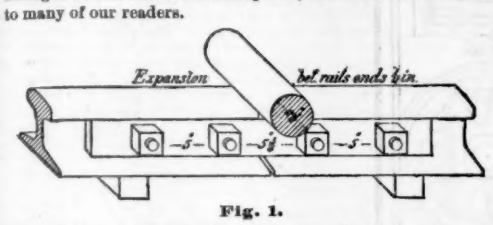


Fig. 1.

Fig. 1 represents the method of making the tests. The rails rested on two square wooden blocks, placed 16 in. apart, and the pressure was put on the round roller shown on top.

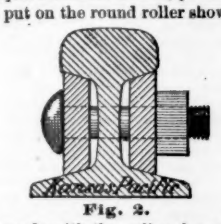


Fig. 2.

Test No. 1 was made with the splice shown in fig. 2, which is used on the Kansas Pacific Railway. It consists of two plain steel plates, 22 in. long by 2 in. wide and ⅛ in. thick. This joint set at 24 tons pressure, when the supports were broken.

Test No. 2 was made with a splice of the same kind as that used before, but the plates were made of the "best fibrous iron." It set at 19 tons and broke at 28⅛ tons' pressure.

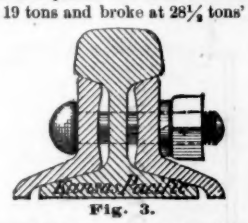


Fig. 3.

Test No. 3 was made with a splice formed of two iron angle plates, 22 in. long by 2 in. wide by ⅜ thick, shown in fig. 3, and also used on the Kansas Pacific Railway. This set at 24 tons and buckled at 36 tons.

Test No. 4 was made with a splice of the same kind, the plates of which were steel. This set at 32½ tons and broke at 46 tons.

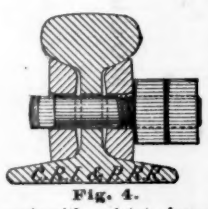


Fig. 4.

Test No. 5 was made with a joint, shown in fig. 4, used on the Chicago, Rock Island & Pacific Railroad, and formed of two ribbed iron plates. These plates were made of 40 per cent. new iron, and were ⅞ in. thick through rib and ⅝ in. through bottom of groove. The splice set at 19 tons and broke at 25 tons.

Test No. 6 was made with a splice of the same kind as the preceding, the plates of which were steel. It set at 24 tons and buckled at 37 tons, but did not break.

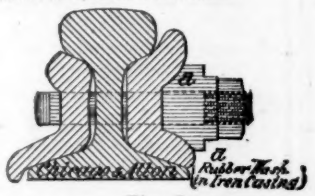


Fig. 5.

Test No. 7 was made with a splice, shown in fig. 5, made with steel plates and used on the Chicago & Alton Railroad. This set at 33 tons, and the supports were crushed at 38 tons.

As the significance of these experiments will be much more apparent if arranged in a tabular form, the following table is given:

Kind of Splice.	Iron Plates.			Steel Plates.		
	Set.	Buckled.	Broke.	Set.	Buckled.	Broke.
Kan. Pac. pl. bars.	19 tons	.....	28⅛ tons	24 tons	.....	.....
" " angle "	24 "	36 tons	.....	32½ "	.....	46 tons
C., R. I. & P. ribbed bars	19 "	.....	25 tons	24 "	37 tons	.....
C., R. I. & P. one double and one angle plate	.....	.....	.....	3 "	38 tons	.....

With the supports placed 14¼ in. apart:

a. A plain steel fish-plate splice set at 27¾ tons.

b. A wrought-iron splice, of the same dimensions, set at 16¾ tons.

c. The same splice as preceding made with steel plates set at 28 tons.

To show the density of the material, some tests were made by punching with a punch 1 in. in diameter and with plates ⅛ in. thick. The results were as follows:

d. Steel plate, strain required 54⅛ tons.

e. Wrought-iron plate, strain required 36 tons.

These tests show clearly the superior strength of the steel splices. It should be added that the steel splices which were tested were made under letters patent to Mr. O. W. Meysenburg.

How to Run a Locomotive—Familiarity with the Road, Signals and Traffic—Firing at the Finish—Feeding the Boiler—Inspection after the Trip.

[From a series of papers by Michael Reynolds, London & Brighton Railway, published in *The Engineer*.]

It is evident that something besides a knowledge of locomotive driving and firing is required to produce a good railway man. To run swift trains with safety and to time, three things must be thoroughly combined in the experience of the engineman, viz.,

KNOWLEDGE OF THE SIGNALS, KNOWLEDGE OF THE GRADIENTS OR ROAD, AND KNOWLEDGE OF THE TRAFFIC.

The greater part of every driver's time upon the foot-plate is occupied in attending to the signals, and until he is familiar with their relative position to the gradients, junctions and stations over and through which he has to run, he cannot approach them voluntarily and at sufficient speed to suit "Bradshaw." To run with confidence, the weather must in all instances be included in our calculation. Some signals, owing to their position, cannot be sighted well until close to them; but in numerous instances they can be seen across the country, and while one engineman is running timidly on to the signal, another takes it into his eye several miles off, and acts accordingly. It is not only necessary to know the gradients and their lengths in order to run well, but no man can be a first-class driver who does not work his engine in accordance with their variations, and with the screw-reversing gear this can be carried out to perfection, and is carried out by our best drivers. Where the influence of gravity is in favor of the train, the boiler should reap the full benefit of the circumstance, as when the case is *vice versa* the boiler has to be liberal in its supply of steam. Undoubtedly he is not far from the top of the premium list who treats his engine as a kind master treats his donkey. How frequently do we see a locomotive which has been "walloped" up hill and down revenge itself on its driver by failing him in his worst need.

Knowledge of the engine, signals and gradients are worthy of every attention, but without a thorough acquaintance with the traffic, and with what is going on both up and down the line, driving is neither safe nor perfect. A few years ago a goods train, with two engines attached, was proceeding south at midnight; after it had passed the driver of a fast express, going north, a thought struck him that for two engines the roll or sound of the train going by him was unusually short. He stepped over to the fireman's side of the foot-plate to see if there were tail lights on the last vehicle of the train, but owing to the curve and speed he could not see; he, however, knowing what goods they were, shut off steam and gave instructions for the tender brake to be screwed on. "It strikes me," said he, "that the whole train is not there, mate." They ran for two or three miles cautiously, when they saw in the distance a red light waved violently, they pulled up at once, easily, when they found the red light belonged to the rear guard of the goods train, and as he held his bull's-eye light full in their face, he informed them that a wagon-axle belonging to his train had broken and thrown ten trucks across their road. The guard got on to the step of the engine, which was moved close up to the scene, when both driver and fireman saw sufficient to convince them that something else beside driving and firing makes good railway men. The perils attending locomotive driving, and the nature of locomotive machinery, demand that a first-class driver should have power over circumstances and the machinery; and it would be easy to prove that, acting with promptitude and self-possession, many a driver, by giving two whistles instead of one, or one instead of two, has averted what must have been a bad collision; and with regard to the motion, whatever a driver knows about it, from circumstances over which he has no control, he will some time or other have to put it to a practical test, probably rather sooner than may be pleasant. What is thought, in too many instances, by young drivers to be a matter of so many hundred miles is simply the product of mental industry and an exertion of mind. It is related of a great soldier of antiquity that whenever in his travels he came to a place that happened, to his mind, to have all the points which constitute a difficult position either to hold or storm, he would, with his stick, sketch upon the ground, and show his friend the positions in which he would camp his soldiers, place them in the hour of battle, and, providing he had to beat a retreat, he would explain the best possible way to do it with the least loss to his army. Therefore, it is recorded, nothing ever happened to this soldier but what he had already planned in his own mind before. Now it is this kind of forethought that distinguishes one driver from another, and no man can become a successful locomotive driver and good railway man upon any other terms. It is, therefore, one out of many important performances to stand by the side of the engine and think what would be best to be done if so-and-so broke asunder; and such self-examination may extend to everything affecting the running. It is impossible to say when, where or how an engine may fail, but he will be an extraordinary man who never breaks down and who meets with no misfortune through others' neglect. Every engine failure is the result of one of two things: it is either a deviation from what the builder intended, or it is a deviation from perfect enginemanship, and we cannot tell what the deviation—the something wrong—is until we know what the thing deviated from—the prior something right—was.

FIRING AT THE FINISH.

The only point now which I will briefly notice is the finish of a trip, which not unfrequently, as regards coal-saving, elevates a driver to the top of the premium list, or it consigns him to the Black List. From the start the fire requires to be kept up round after round of firing, six shovelfuls at each round, until experience cries "Hold." This may happen sixty miles from the terminus, or it may be only thirty miles—that depends upon the load, weather and gradient; but to insure certain advantages, the trip should be concluded with a fire allowed to burn down to the bars from, say, the fire-hole door, which means a full box of fire. Before, however, arriving at this stage of the trip the last few rounds of fire should consist of the "small," which should be set aside during the first half of the trip, and with good judgment used gradually in the two back corners. When the fire can be worked down from the full—and it is simply a matter for a fireman to do with a little practice—it has a marked effect upon the consumption per mile, independent of what is effected through the links. I have for some years carefully observed what things constitute the difference between driver and driver, and I have noticed, among many other things, that the running in with a low fire plays a significant part. Two or three cwt. of coal in a large locomotive fire-box looks small, and is probably by some thought not worth the trouble of saving, but 3 cwt. per day for, say, twenty-four days, are 3 tons 12 cwt. per month. Now, not unfrequently engines are run into the shed with more fire than what brought them the last fifteen or twenty miles, even by men who take every precaution on the road to economize fuel. What does this teach? That the fireman is not sufficiently impressed with the importance of contributing his share towards saving fuel, or that he is not properly under the control of the driver, but is allowed to exercise a judgment not matured by experience. One advantage to be gained by a fire being allowed to gradually burn down cannot be overlooked without neglecting a point worthy of every attention. Suppose at fifty miles away from home the fire is put on for the last time, by the time the engine approaches the thirty-fifth-mile post there will be scarcely any smoke left in the coals; what remains is pure carbon, and the fuel being free from smoke, the coating of the tubes with soot no longer goes on, but every facility is then afforded for the fuel uniting chemically with the oxygen of the air, the result of such union being carbonic acid gas, which, under the influence of a strong blast, is capable of conducting a searching heat to the tubes, and on its passage through them it removes every particle of unburnt carbon or soot with which it comes in contact—really and practically cleaning them. Hence the superabundance of steam as the fire burns down, making, what is demonstrated in every-day practice, more steam with a foot of fire than what was being done when the same fire-box had double the quantity of coal in it. I remember when firing one of the fastest and most important trains in the world, having for the first time an engine that refused to steam nicely, and was only made to keep time through mental and manual strategy throughout the up trip, but before it was completed the tubes were subjected to the process already mentioned, and notwithstanding right up to the finish she was particularly shy of steam. Considerable speculation went on as to how she would steam on the down trip of 160 miles with one stop. After looking at the tubes it was evident from their appearance sweeping them was unnecessary, and it was decided to trust to a proper fire made up in good time and properly warmed through before joining the train; the result was simply superb, and since then I have repeated the operation many times and found it very efficient. When the fire burns away quickly and more is required to run the train home, more should be added before the fire gets too low. The practice of breaking up the clinker is not a good one, as it allows what fire there is to fall through the bars, and it admits too much cold air into the tubes, there not being sufficient heat in the box to perform two operations at the one time—that is, to heat the air to the boiler temperature and at the same time to keep the pressure of the steam up. The clinker is best cracked in the centre and then let alone, when the oxygen of the air will burn or destroy it more gradually.

SUPPLYING WATER TO BOILER.

A good deal of an engine steaming nicely frequently depends upon how the boiler is supplied with water; to assist in keeping the boiler at an even temperature the supply such be just sufficient to keep the water at one place in the glass. There are times when the feed must be taken off in order to allow the boiler to make sufficient steam to ascend the inclines, but for economical working and for keeping the boiler full of steam, there is nothing better than keeping the water up in the glass, just where the engine carries it best, by regulating the supply to the demand; but when running in, this rule is no longer binding. As the steam blows off by the fire cleaning the tubes, water should be got into the boiler as high as it will carry it without priming, as before the terminus is reached it will, probably, be found useful and prevent any more fire being put on—a full boiler of water and steam, ten minutes before closing the regulator, with a mere handful of fire left, are as necessary to economical working as anything which can be mentioned. Before shutting the regulator, either at a station or when finishing, the blower should be put on a second or two so that the jet of steam can have time to get the smoke under—and not put on full after the regulator is shut—when it has done this it should be eased until it is scarcely audible. The cylinders and valves require lubricating on running in; and on long runs, on being checked by signals on approaching a junction the syphons should be opened, especially if the water in the boiler is dirty.

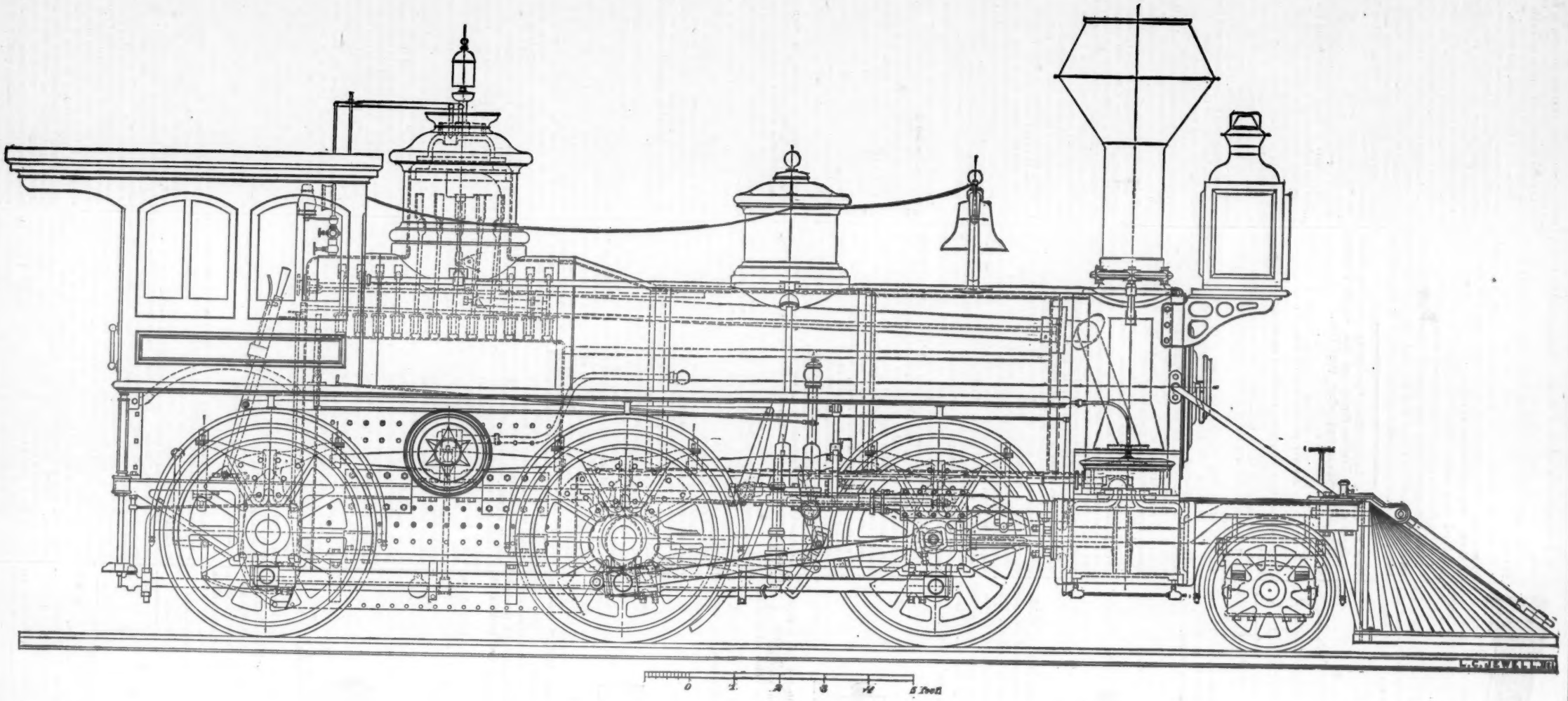
SHUTTING OFF REGULATOR.

There is a vast difference among drivers with regard to shutting the regulator for stopping at the same station. No rule can be laid down for this. Some men will close it half a mile farther off than others; but as the momentum of the train represents so much stored up energy put into it by what went into the fire-box, so the driver must see that he gets it all returned to him by shutting off steam in time to allow that power to spend itself in taking the train into the station. Sometimes part of this energy is in the driving-wheel. A 7-ft. wheel engine—speed and weight of train being the same—will carry a train after the regulator is shut farther than a 6-ft. wheel would, and a first-class engineman takes this into his calculations. It is decidedly not economical, when the speed will allow it, to waste in brake friction so many foot-tons of valuable power, which represents a certain weight of coal.

INSPECTION AFTER THE RUN.

After the engine stops on the termination of its trip, it is a good rule to examine it there and then; for after standing in the station some time, blocked in, when inspected in the shed anything which was hot will there appear with the chill off. Some companies wisely put in engine-pits at their principal stations, by which they avoid risk and accidents to machinery. In the shed, before the engine is put into the hands of the turner to be put away, it is examined thoroughly, which includes testing the valves and pistons. To perform this latter part of an engineer's duties, I think the best plan—for there are others—is to set the engine in such a position as to bring both little ends exactly opposite each other and as near the motion plate as it is possible to get them. With the engine in this position one big end will be above the axle and the other below, and they will both be the same distance from the fire-box. If it is a right-hand crank axle the right-hand big end will stand above the shaft, and with the reversing lever in forward gear steam on will test the right-hand cylinder piston-rings; with the reversing lever in back gear steam on will test the left-hand cylinder piston; and with the reversing lever in the centre that will test the valves. When it is a left-hand crank axle, the left-hand big end stands above the shaft instead of the right-hand one, and the lever full over will test the left cylinder, and when right back the right cylinder. The smoke-box should be examined with a little steam on to test the steam pipe joints and tallow pipe; the blower should be put on and tubes inspected; the ashes, when closely watched day after day will surely and with certainty show the gradual wear of the motion; the ashes, as they lie thick in one place and thin in another, simply represent the vacuum wave of the blast, and show the position of the blast pipe in relation to the chimney; if the ashes are even, the blast pipe is truly concentric with the chimney, if they are not the blast pipe is out.

Things appertaining to the foot-plate generally find their place in men's experience and but little in books; but I think among enginemen, as with other men, while opinions and abilities differ very much, it is invariably found that a first-class driver is a man of taste, and—which is inseparably connected with that cardinal quality of the mind—he is also a man of sound judgment.



MOGUL LOCOMOTIVE,

By Brooks' Locomotive Works, Dunkirk, New York.

Specification of Mogul Locomotive by the Brooks Locomotive Works.

The engine has six coupled wheels and a two-wheeled truck. The general design is shown by engraving of engine on another page.

GENERAL DIMENSIONS.

Cylinders, 17 in. in diameter and 24 in. stroke.
Driving-wheels, 56 in. in diameter outside of tire.
Gauge, 4 ft. 8½ in. Fuel, bituminous coal or wood.
Weight of engine in working order, about 75,000 pounds.
Total wheel-base of engine, 22 ft. 6 in.; rigid wheel-base, 15 ft.; total wheel-base of engine and tender, 42 ft. 6 in.

Boiler.—To be of the kind known as the "wagon-top" style, made of Pennsylvania charcoal iron, ⅝ inch thick, or homogeneous cast steel ⅝ inch thick. Cylinder courses one plate each, with horizontal seams placed over the water line. Horizontal seams and waist connection seams double riveted.

Boiler strongly made and well braced in all its parts, provided with cleaning holes, etc.

Cylinder part of boiler 48 in. in diameter at smoke-box end; made telescoping back.

Dome, 28 in. in diameter and 26 in. high, placed over the fire-box.

Flues, iron, 160 in number, 2 in. in diameter, 11 ft. long, set with copper bushing at fire-box end. Before lagging is put on, boiler to be fired up and tested, as perfectly tight, under a steam pressure of 165 pounds.

Fire-Box.—Made of homogeneous cast steel, 66 in. long, 35 in. wide inside; sides, crown and back sheets ⅝ inch thick; fue sheets, ½ inch thick. Water space 3 in. back and sides, 4 in. front. Stay bolts of Ulster iron ⅞ inch diameter, placed not over 4½ in. apart, screwed and riveted over sheets at both ends. Crown bars made of two bars iron 4½ by ⅝ inch, welded at ends, placed not over 5½ in. from centre to centre; ends having firm bearing on side sheets. Crown sheet securely fastened to bars by rivets, placed not over 4½ by 5¼ in. apart. Grates, suitable for the fuel. Ash-pan, approved design. Smoke-stack, suitable for the fuel.

Safety Valves.—Two in number, patent relief, placed in dome, one set to limit the pressure desired, the other adjustable by a lever in the cab.

Cylinders.—Placed horizontally; each cylinder cast in one piece with half saddle; right and left-hand cylinder reversible and interchangeable, accurately planed, fitted and bolted together in the most approved manner.

Frames.—Of hammered iron with pedestals welded on, planed full length. Top bar 3¾ in. by 3 in. deep. Pedestals cased with cast-iron gibs and wedges, to prevent wear by the boxes.

Yoke.—Extending across the frames.

Pistons.—To have cast-iron spider and follower with Dunbar's patent steam packing, with rods of patent cold rolled iron.

Guides.—Of hammered iron case-hardened 3¾ in. wide, 4 in. deep, fastened to yoke.

Valve Motion.—Approved shifting-link style, graduated to cut off equally at all points of the stroke. Links of best hammered iron, well case-hardened. Rocker shafts of wrought iron with journals 3½ in. in diameter and 14½ in. long; arms 1⅞ in. thick. Reverse shaft made with arms forged on.

Driving-Wheels.—Six in number, 50½ in. in diameter inside of tire. Centres of cast iron, constructed with hollow hubs and rims, solid spokes, relieving the centres from all strain from contraction in cooling by a uniform distribution of metal.

Tires.—Of best cast steel, flanged, 5¼ in. wide and 2¾ in. thick when finished. Middle pair, plain tires 6 in. wide.

Driving-Axles.—Of best hammered iron; journals 6½ in. in diameter and 8 in. long. Wheel fit 6½ in. in diameter, 7¼ in. long.

Wrist Pins.—Of best cast steel. Wheel fit 7 in. long and 5 in. in diameter. Main wrist 4½ in. in diameter and 4½ in. long. Side rod wrist 3 in. in diameter and 3 in. long.

Springs.—Of best quality cast steel.

Connecting Rods.—Of best hammered iron, fitted with all necessary straps, keys, brasses, feeders, etc.

Equalizing Beams.—Of good design, with steel or case-hardened bearings.

Feed Water.—Supplied by two brass pumps with valves and cages of brass, well fitted. Plungers of patent cold rolled iron, and one injector. Cock in feed pipe regulated from the footboard.

Engine Truck.—To have patent swing and radial motion centre. Frame of wrought iron. Steel-tired wheels of approved make, 30 in. in diameter; axle of best hammered iron with inside-bearing journals 5 in. in diameter, 10 in. long. Wheel fit 5 in. in diameter, 7 in. long. Springs of best cast steel hung on equalizing beams.

Engine Cab.—Substantially built of walnut, well finished, and securely braced to boiler and running boards.

Pilot.—Made of oak and ash, well braced.

Tender.—Furnished with two four-wheeled trucks. Wheels 30 in. diameter. Frame made of oak, well braced, or iron if desired.

Tank.—Made of first quality Pennsylvania tank iron with angle-iron corners, well braced. Plates of No. 7 iron. Capacity, 2,400 gallons.

Finish.—Boiler lagged with wood, jacketed with Russia iron secured by brass bands. Dome lagged with wood, with brass casing on body. Top and bottom ring cast iron, painted.

Cylinders lagged with wood, jacketed with brass with finished cast-iron heads. Steam chests cased with brass. Top cover made of cast iron painted. Cylinders oiled from cab through pipes under the jacket.

Painting.—Engine and tender to be well painted and varnished.

Miscellaneous.—Engine furnished with running boards extending from the cab to the smoke-box, made of oak or ash, edges bound with brass. Hand rails. A complete set of tools, consisting of two jack screws, pinch bar, hard and soft hammers, monkey, packing and flat wrenches, chisels, pail, broom, coal pick, ash hoe, tool boxes, etc. Sand-box, operating valves with lever from the cab, signal and alarm bells, whistle, steam and water gauges, heater and gauge cocks, bracket and board for head-light bolted to smoke-box, oil cans, etc., etc. Cylinder, pet cocks and blower cock operated from the cab.

WEIGHT OF ENGINE.

Weight of engine in working order.

On each driver	10,750 lbs.
" all the drivers	64,500 "
" truck	10,500 "
Total weight of engine about	75,000 lbs.

CAPACITY.

Load—in addition to engine and tender.

On a level	1,450 gross tons.
" a 20 ft. grade	640 " "
" " 40 " "	400 " "
" " 60 " "	290 " "
" " 80 " "	220 " "
" " 100 " "	170 " "

—Gen. Wm. Mahone, President of the Atlantic, Mississippi & Ohio Company, failed to secure the nomination for Governor of Virginia, for which he had made a very active canvass. In the convention he had the highest vote, but after several ballots it seemed impossible for him to secure a majority and his name was withdrawn, apparently to prevent a coalition among the anti-Mahone men.

Train Accidents in July.

The following accidents are included in our record for the month of July:

REAR COLLISIONS.

On the evening of the 1st, an express train on the Pittsburgh, Cincinnati & St. Louis road ran into the rear of a freight, which was going into a siding at Urbana, O. The engine was badly broken and the engineman hurt.

On the morning of the 11th, a ballast train on the Intercolonial Railway ran into the rear of a freight train, which was stopping at Oxford, N. S. The ballast engine, with the caboose and three other cars of the freight were completely wrecked and three trainmen hurt. The accident was caused by neglect of rules and signals.

On the 19th, a special train on the Chicago, Burlington & Quincy road ran into the rear of a coal train near Ottawa, Ill., damaging the caboose. The engineman of the special was hurt. The caboose was forced up upon the coal car in front of it.

On the evening of the 19th, a freight train on the Housatonic Railroad broke in two near Trumbull Church, Conn., and the two sections afterwards came together, breaking two flat cars somewhat.

On the 22d, on the Baltimore & Ohio road, near Grafton, W. W., an engine sent out by the strikers at Grafton to pursue and stop a freight train, came upon it on a curve and ran into its rear end, wrecking a car.

Early on the morning of the 29th a train on the Pennsylvania Railroad, having troops on board, ran over a purposely misplaced switch at Johnstown, Pa., and into some cars which were standing on a siding. The engine and five cars were piled up together, three cars being completely wrecked, and seven persons were hurt. The switch was misplaced by strikers, a number of whom were arrested.

BUTTING COLLISIONS.

On the evening of the 10th a passenger train on the New Jersey Midland road ran over a misplaced switch and into the head of an engine which was standing on a siding at Middletown, N. Y. Both engines were damaged.

On the morning of the 13th a passenger train on the Cleveland, Tuscarawas Valley & Wheeling road ran into the head of a freight which was switching some cars at Pike Run, O. Both engines were badly damaged. The freight train had sent out a flag, which the passenger train failed to see.

On the morning of the 22d, near Wabash, Ind., on the Cincinnati, Wabash & Michigan road, there was a butting collision between two freight trains, by which both engines and several cars were wrecked and a man badly hurt. One of the trains is said to have been ahead of its time.

On the afternoon of the 23d there was a butting collision between two passenger trains on the West Pennsylvania Division of the Pennsylvania Railroad at Guyasuta, Pa. Both engines were wrecked, several cars damaged, both enginemen, the express messenger, mail agent and three passengers killed and 21 persons injured. The trains were through trains run over that division in consequence of the break in the line at Pittsburgh.

Near noon on the 24th, near Boykin's, Va., on the Seaboard & Roanoke road, there was a butting collision between the pay train and a repair train. Both engines were wrecked, several cars damaged, the Paymaster and two trainmen hurt.

On the afternoon of the 25th a passenger train on the Long Island Railroad ran into the head of a freight, which was backing into a siding at Winfield, N. Y., and the passenger engine was badly broken. The freight had sent out a flag, but it was not seen in time.

CROSSING COLLISION.

On the evening of the 29th a train on the Prospect Park & Coney Island road ran into a New York & Manhattan Beach train at the crossing of the two roads at Paraville, N. Y. The Prospect Park engine was thrown over and three Manhattan Beach cars badly broken. A brakeman and two passengers were hurt. It is said that both trains were trying to reach the crossing first, and that each could be plainly seen from the other.

DERAILMENT, BROKEN RAIL.

On the evening of the 25th an express train on the Illinois Central road struck a broken rail near Pana, Ill. The engine passed over, but all the cars left the track and were much damaged. Two trainmen and three passengers were slightly hurt.

DERAILMENTS, BROKEN WHEEL.

On the 19th seven cars of a freight train on the Boston & Albany road were thrown from the track by a broken wheel near Worcester, Mass., and badly broken, blocking the road five hours.

On the 25th an excursion train on the Philadelphia & Atlantic City road ran off the track near Winslow, N. J., wrecking several cars, killing a brakeman and injuring 10 passengers. The accident was caused by a broken wheel. Three cars left the track and two of them upset.

DERAILMENTS, BROKEN TRUCK.

On the morning of the 9th several cars of a freight train on the Erie Railway were thrown from the track near Howell's, N. Y., by the breaking of a truck under one of them. The track was blocked four hours.

On the afternoon of the 23d two cars of a freight train on the Chicago, Rock Island & Pacific road were thrown from the track on a trestle in East Leavenworth, Mo., by the breaking of a truck under one of them. Both cars fell 20 feet and were wrecked, injuring a brakeman slightly.

DERAILMENT, BROKEN BRIDGE.

On the 24th the engine of a freight train on the Alabama & Chattanooga road broke through a high trestle near Rising Fawn, Ga., and the engine fell to the ground and was wrecked, killing the engineman and fireman.

DERAILMENTS, SPREADING OF RAILS.

On the afternoon of the 10th a passenger train on the Kansas City, St. Joseph & Council Bluffs road was thrown from the track near Iatan, Mo., by the spreading of the rails. The engine and two cars were badly broken, the fireman hurt and the road blocked several hours.

On the afternoon of the 13th a mail train on the Missouri Pacific was thrown from the track near Atchison, Kan., by the spreading of the rails and three cars were badly broken. The mail agent was injured.

On the afternoon of the 17th a freight train on the Central Pacific road was thrown from the track near Tamarack, Nev., by the spreading of the rails, which had been badly warped by the burning of a snow-shed just before. The first engine upset and the second engine and three cars were piled up on it and wrecked, the wreck being burned up. The rest of the train was cut loose and run back down the grade. Three trainmen were hurt.

DERAILMENTS, WASH-OUTS AND LAND-SLIDES.

On the afternoon of the 5th a passenger train on the Cleveland, Columbus, Cincinnati & Indianapolis Railroad ran into a washed-out culvert near Galion, O., wrecking the engine and baggage car. The engineman was crushed to death under the baggage car; the fireman, conductor and 5 passengers slightly hurt.

On the night of the 28th a passenger train on the Cleveland, Tuscarawas Valley & Wheeling road was thrown from the track by a land-slide near New Philadelphia, O., blocking the road all night.

DERAILMENTS, CATTLE.

On the 4th a passenger train on the Kansas City, St. Joseph & Council Bluffs road ran over a cow near Council Bluffs, Ia., and the engine was thrown from the track, blocking the road several hours.

On the night of the 4th the engine of a freight train on the Chicago, Milwaukee & St. Paul road was thrown from the track near Homer, Wis., by some cattle on the track. The road was blocked all night.

On the 8th a construction train on the Louisville, New Albany & Chicago road ran over some hogs near Stinesville, Ind., throwing several cars from the track, killing one man and injuring eight others. The train was running backward at the time.

On the morning of the 18th a freight train on the Fitchburg Railroad ran over a mule near Athol, Mass., and one car was thrown from the track, blocking the road some time.

On the 20th a freight train on the Chicago, Pekin & Southwestern road ran over some horses near Coal City, Ill., and the engine left the track and upset. Five cars also ran off and were badly broken.

On the 24th a special passenger train on the Georgia Railroad, having troops on board, ran over a cow near Union Point, Ga. The engine was thrown from the track, three cars were piled up on it and wrecked and the wreck caught fire and was burned up. The engineman was caught under the engine and burned to death, and one soldier was badly hurt.

About noon on the 30th an express train on the Philadelphia, Wilmington & Baltimore road ran over a cow at Brandywine, Del. The engine and three cars passed over, but the fourth car went off the track and upset, dragging the fifth car after it, and the three remaining cars were piled up on these two, wrecking them completely. Two passengers were seriously and six slightly hurt. The track was blocked two hours.

DERAILMENT, ACCIDENTAL OBSTRUCTION.

On the 6th a passenger train on the Burlington & Southwestern road struck a hand car which was on the track near Warren, Ia., and the engine was thrown from the track, delaying the train an hour.

DERAILMENTS, MISPLACED SWITCH.

Near noon on the 4th a passenger train on the Parker & Karns City road was thrown from the track in Parker, Pa., by a misplaced switch.

On the night of the 7th the engine and two cars of an express train on the Chicago & Alton road were thrown from the track by a misplaced switch at Drake, Ill., and the engine and baggage-car were wrecked, killing the fireman and injuring the engineman and baggage-master.

On the afternoon of the 12th a freight train on the New York Central & Hudson River road was thrown from the track in Buffalo, N. Y., by a misplaced switch. Two trainmen were hurt.

DERAILMENTS WITH MALICIOUS INTENT.

On the morning of the 17th a freight train on the Baltimore & Ohio was thrown from the track in Baltimore by a misplaced switch, which is believed to have been purposely set wrong by some striking employes. The engineman and fireman were hurt.

On the night of the 24th some cars of a freight train on the Chicago, Burlington & Quincy road were thrown from the track in Chicago, Ill., by obstructions put on the track by rioters.

On the morning of the 25th an express train on the Erie Railway was thrown from the track near Owego, N. Y., where a rail had been removed by some of the striking employes of the road. The whole train, an engine and four cars, left the track and was partly upset, injuring a brakeman and two passengers slightly.

On the evening of the 28th an Intercolonial express train was thrown from the track by a switch, believed to have been purposely misplaced, on the Grand Trunk track at Etchemin, P. Q. The engine went down a high bank and the tender was thrown over directly upon it; the baggage and one passenger car were piled up together beside the engine, the other cars remaining on the ties. Four persons were slightly hurt.

Late on the night of the 30th a train with troops on board was thrown from the track near Keyser, W. Va., by a switch which had been purposely misplaced. The engine and one car left the track and a soldier was badly hurt.

On the 31st the engine and one car of a troop train on the Baltimore & Ohio road were thrown from the track at Keyser, W. Va., by a purposely misplaced switch, doing some damage and injuring 10 soldiers.

DERAILMENTS, UNEXPLAINED AND MISCELLANEOUS.

On the morning of the 3d the engine of a freight train on the Kansas Pacific road ran off the track in Leavenworth, Kan., blocking the track an hour.

On the night of the 7th three cars of a freight train on the Allegheny Valley road ran off the track in Pittsburgh, Pa., and ran into a small brick house adjoining the track, tearing down one side of it and injuring four of the occupants.

On the 10th a passenger train on the Ware River Branch of the Boston & Albany Railroad ran off the track on a sharp curve near Thorndike, Mass., damaging the engine and breaking the cars badly.

On the evening of the 10th a passenger train on the Fort Wayne, Muncie & Cincinnati road ran off the track near Eaton, Ind. The engine went into the ditch, injuring the engineman fatally, the fireman and the Superintendent, who was on the engine, less severely.

On the 11th a special engine on the Philadelphia & Reading road ran off the track at Hamburg, Pa.

On the 13th a passenger train on the Cairo & St. Louis road ran off the track near Murphysboro, Ill., the cars going down a high bank into a creek. The express messenger was badly and 15 passengers slightly hurt.

On the evening of the 15th an express train on the Pennsylvania Railroad ran off the track in the tunnel at West Philadelphia, Pa., damaging the engine and wrecking the baggage car. The fireman and a passenger were killed and the engineman hurt.

On the 16th, as some cars on the Chicago, Rock Island & Pacific road were being backed into a siding at Leavenworth, Kan., the rear car was forced off the end of the siding and badly damaged.

On the afternoon of the 17th a construction train on the Burlington & Lamoille road ran off the track near Underhill Flats, Vt., doing some damage.

On the afternoon of the 22d four cars of a passenger train on the Brooklyn, Bath & Coney Island road ran off the track in Brooklyn, N. Y. A passenger was hurt.

On the evening of the 24th a passenger train on the Cincinnati & Westwood road was thrown from the track and wrecked in Cincinnati, O., killing four persons and injuring 12 others.

OTHER ACCIDENTS.

On the evening of the 17th, as an express train on the Indianapolis, Bloomington & Western road was near Jamestown, Ind., the parallel rod broke, damaging the engine, breaking up one side of the cab and injuring the fireman badly.

This is a total of 53 accidents, whereby 21 persons were killed and 144 injured. Ten accidents caused the death of one or more persons; 22 caused injury less than death, while 21, or 39.6 per cent. of the whole number, caused no injury serious enough for record.

These accidents may be classed as to their nature and causes as follows:

COLLISIONS:	
Rear collisions	6
Butting collisions	6
Crossing collision	1
	— 13
DERAILMENTS:	
Unexplained	10
Broken rail	1
Broken wheel	2
Broken truck	2
Broken bridge	1
Spreading of rails	3
Wash-out	1
Land-slide	1
Cattle on track	7
Accidental obstruction	1
Misplaced switch	7
Malicious obstruction	1
Rail removed	1
Running off end of siding	1
	— 39
Broken connecting rod	1
Total	53

Three collisions were caused by want of or failure to use signals; two by misplaced switches; one by a broken train and one by an attempt of strikers to stop a train. Eleven accidents were caused directly by defect or failure of road or equipment. The broken bridge recorded was an ordinary wooden trestle, but we have no further particulars as to its failure. There were nine accidents, two collisions and seven derailments, caused by misplaced switches; but in four of the seven derailments the switches were set wrong purposely and they are accordingly classed under derailments with malicious intent. Two collisions were between passenger, seven between passenger and freight and four between freight trains; 22 derailments recorded were of passenger and 17 of freight trains, and the only other accident was to a passenger train.

As compared with July, 1876, there was a decrease of 26 accidents, an increase of four in the number killed and of 75 in that injured.

The number of accidents is small, especially when the disturbed condition of traffic during the last week in the month is considered. But few acoidents in the record are traced directly to the strike, and it is exceedingly probable that many minor accidents, such as derailments of freight trains and damage to freight cars, escaped general notice, only accidents to passenger trains or those causing death or severe injury being deemed worthy of notice amid the general excitement. The destruction and damage done to railroad equipment during the month was very great, but most of it was from causes that cannot be classed among train accidents. As it is, the effects of the strike are hardly seen at all in this record. The number of killed and injured is considerably above the average, as there was an unusual number of fatal accidents.

For the year ending with July the record is as follows:

	No. of accidents.	Killed.	Injured.
August	78	22	76
September	106	41	133
October	103	40	115
November	96	23	135
December	88	94	141
January	147	10	148
February	56	5	41
March	58	9	31
April	69	13	34
May	46	12	41
June	49	16	92
July	53	21	144
Totals	949	306	1,131

The averages per day for the month were 1.71 accidents, 0.68 killed and 4.65 injured; for the year they were 2.60 accidents, 0.84 killed and 3.10 injured. The averages for the month were thus below those of the year, except in the number injured. The average casualties per accident for the month were 0.396 killed and 2.717 injured; for the year, 0.322 killed and 1.192 injured.

Contributions.

Regulations for Cash Remittances

[From a forthcoming work entitled "Railway Revenue and its Collection," soon to be published.]

(Copyright, 1877, by the Railroad Gazette).

The greatest diversity exists in reference to the rules and regulations governing the immediate disposition of agents' and conductors' collections.

Upon a very few lines the agents are required to remit each day the total amount collected by them; upon other lines they are required to remit every other day, or semi-weekly or weekly; the great bulk of the companies enforce no definite rules as to the time of remittance or the amount, agents being expected to exercise their best judgment in the matter.

It is perhaps needless to say that the disposition of the funds passing through the hands of agents and others should be governed by clearly-defined rules, general in their application.

The availability of a railway company's revenue as well as its safety will be best secured by hurrying it forward into the treasury with the least possible delay.

REMITTANCES DIRECTLY TO THE BANK.

It was the universal custom at one time for agents and conductors to remit directly to the Treasurer or Local Treasurer of the company. This practice has, however, been changed by some of our most highly-organized companies, the remittances upon such lines being sent by agents and conductors directly to the bank or banks where the company keeps its local account. Under this system the number of hands through which this money passes is lessened and the expense of counting it has to be borne by the bank. This expense is an important item, and as our best banks will rarely if ever pay interest upon accounts likely to fluctuate so widely as those of our railway companies, the least return they can make for the use of the money is to perform the clerical work of handling it.

Under the plan suggested of sending remittances directly to the bank, the Local Treasurer makes a draft or check from day to day for such cash as he needs in the payment of wages and the settlement of accounts. The money comes to him counted and assorted in packages of such size and denomination as he wishes, and he is thus saved all trouble and expense in connection with it.

Where remittances are made directly to the banks the railway company should insist upon the money being counted by a teller experienced in counting money and of tried and approved honesty.

If the teller is not entirely trustworthy, the fact that he can misrepresent the contents of the packages received and opened by him will be a constant temptation. The fact that this is so and the further that he has no protection against the misrepresentations and slanders of any dishonest persons among those making remittances is also known; he may consequently at any time be accused, unjustly, of tampering with the remittances opened by him.

DISPUTES IN REFERENCE TO THE COUNT.

In the disputes that will constantly arise between the agents and conductors and the bank officials in reference to the exact amount packages contain, the Local Treasurer will find it extremely difficult to judge who is in the wrong; and as the bank will insist upon its count it will sometimes, perhaps, be necessary to require that the work of counting the money be assigned to a new man, or that adequate measures be adopted to decide definitely in reference to the reliability of the teller against whom the charge is made.

Of course the same objections and disputes and suspicions would occur if the remittances were made directly to the office of the Local Treasurer, so that nothing would ordinarily be gained by having them transferred back to that office.

From the foregoing it will be seen that the duty of receiving and counting the currency contained in packages remitted from day to day by parties, through the express or otherwise, is exceedingly disagreeable at best, and a duty that the most upright and courageous official may well esteem himself happy in not having to perform.

STATEMENTS REQUIRED FROM BANK.

At the close of each day's business the bank should be required to send the Local Treasurer an abstract containing a statement of the amount received from each agent and conductor; this statement should be footed. With it the bank should send the cash slips or statements which it received with each agent's and conductor's remittances. These slips should at once be entered by the Local Treasurer upon the agents' and conductors' cash book, and if found to agree, when added together therein, with the amount reported by the bank, then the slips should be stamped with the date they are credited. The slips should then be returned without delay to the agents and conductors. The slip so stamped is the agent's or conductor's receipt and informs him of the exact date it was placed to his credit.

The stamping of the cash slip of the agent obviates the necessity of the Local Treasurer's writing a formal receipt, and thus much time is saved and a considerable item of expense obviated.

FORM OF CASH BOOK.

The form of cash book in use upon many roads requires that the name of the agent or conductor shall be written in full every time a remittance is received from him; where there is a a large number of persons remitting at short intervals, the mechanical duty of entering the names and amounts thus requires considerable time each day; it is also necessary that all of the remittances made by an agent or conductor so entered should ultimately be grouped together so as to form a connected record. The only simple and intelligent way to perform the duty of bringing the various remittances together is to post them one by one to the account of the agent or conductor upon the agents' and conductors' ledger. This is a very laborious duty; it occupies much time, and is in consequence expensive; costly ledgers and cash books are rapidly filled, and, unless the utmost care is exercised at every step, the extent of the work invites errors in transcribing the amounts upon the ledger, and these in turn throw the accounts and books out of balance.

STATION AGENTS' AND CONDUCTORS' CASH BOOK.

The necessity of finding some simple and inexpensive substitute for the cumbersome and expensive system just described suggested the introduction of the "Station Agents' and Conductors' Cash Book."*

This book is exceedingly comprehensive, and the amount of information it contains is crowded into the least possible space, a single leaf of the book being sufficient to accommodate the remittances of forty or fifty agents for a month. The name of the agent or conductor is inserted in the first column of the book; opposite the name and upon the same line the amount remitted is entered in the proper column, columns being provided for each working day in the month. In this way the remittances of an agent for a month only occupy one line. At the close of the month the various amounts remitted by an agent are added across and carried into a column showing the *totals for the month;* by adding this last mentioned column, the aggregate footings of agents and conductors are given. If the total footings for the different days in the month, added together, agree with the aggregate column for the month, then the fact of such agreement is conclusive evidence of the correctness of all the footings and totals.

At the close of a day's business the various amounts entered in the column provided for that particular day upon the cash book are added together, and the total amount inserted at the bottom; this total amount is transcribed daily in the general cash book before the latter is balanced. In this way the total cash receipts from all sources are shown upon the general cash book.

In posting the cash remitted by agents and conductors to the credit of their accounts as the same are opened upon the side ledger, only the aggregate amount remitted by the agent or conductor is entered. If the amount so posted does not agree exactly with the amount claimed by the agent or required to balance the account of the conductor, then the remittances as they are entered in detail upon the side cash book are compared with the returns of the agent or conductor.

The introduction of the station agents' and conductors' cash book cannot but greatly reduce the expenses of a railway company, both for stationery and clerk hire.

THE GENERAL CASH BOOK.

The General Cash Book† embraces the particulars of all the receipts and disbursements of cash of the road as the same finds its way into and out of the office of the Local Treasurer.

The general cash book with the general journal contains the substance of all the matter embraced in the general ledger, the information contained in the latter being drawn from such cash book and journal.

The information contained in the subsidiary ledgers is posted from the general cash book, the general ledger journal and the subordinate journals already described.

It will be seen, then, that it is of the utmost importance that the most perspicuous clearness should be exercised in entering the various transactions that find a place of record in the cash book.

The general cash book is arranged so as to afford the following information:

Receipts—Cash Debits.

1st. The column for entering the folio of the ledger to which the amount is posted.

2d. The name or the account, *i. e.*, the individual, firm or corporation from whom the money is received; or, if the amount is carried out into the *miscellaneous column*, then the name of the account to which the money is to be credited is inserted in this column.

---

* The form for a page of this book is given below. It is "Form 73" of the volume.

Form 73.—[Size 38×18½ in.]

Record of CASH *Received from* STATION AGENTS *and* CONDUCTORS' *on the Dates Specified in Headings during the Month of*..... 187

Stations.	Name of Agent or Conductor.	1st.	2d.	3d.	4th	(And so on, a column being provided for each working day in the month.)	Total for Month	Folio of Station Agents and Conductor's Ledger.	Name of Agent or Conductor.
	1 2 3 4 5 6 7								1 2 3 4 5 6 7
Total.									

[NOTE.—The *special* remittances made direct to the Local Treasurer should be interlined, opposite the Agent's name, in red ink. These remittances should be footed separately.]

---

† Form 74, in the Appendix to the volume, which is as follows:

Form 74.—[Size 13¼ × 16½ in.]

GENERAL CASH BOOK.—(LEFT-HAND PAGE.)

RECORD *of Cash* RECEIVED *this* ..... *day of* ....., 187 .

☞ For Credit side of this Cash Book, see next page.

Folio of Ledger.	Name.....	Nos. of Remittances.....	Explanation of Account.....	From Agents and Conductors.....	From R.R. Co.'s and Foreign Ticket Agents.	From Various Persons.....	From Land Department.....	Miscellaneous. (General Ledger Accounts.)	Total cash receipts.....

GENERAL CASH BOOK.—(RIGHT-HAND PAGE.)

RECORD *of Cash* DISBURSED *this* ..... *day of* ....., 187 .

☞ For Debit side of this Cash Book see preceding page.

Folio of Ledger.	Name.....	Local Treas.'No.	Audit No.....	Explanation of Account.....	Paid Account Audited Accounts.....	Paid R. R. Co's and Foreign Ticket Agents.	Paid Advanced Charge Drafts.	Miscellaneous. (General Ledger Accounts.)	Total Cash Disbursements...

3d. The column for entering the numbers of the remittances, each remittance being numbered in consecutive order.

4th. In this column a concise explanation or history of the remittance should be given.

5th. In this column the aggregate amount of remittances of agents and conductors is entered; also any special remittances that require particular mention which it is impossible to give in the agents' or conductors' cash book already described.

6th. All remittances received from or on account of railway companies, transportation lines and foreign ticket agents are inserted in detail in this column.

7th. This column is designed for amounts received from individuals, firms and corporations other than railway companies, viz.: "Various Persons."

8th. This column is for amounts received for lands sold on account of the company's land grants; the amount being *credited* to the Land Department, all sales made being *charged* to the Land Department.

9th. This column is for miscellaneous amounts collected, such as amounts paid by express companies, the Post Office Department, War Department, on account of bills receivable, securities sold, and interest and exchange, each amount being posted directly to the proper account on the general ledger. No amounts save those affecting general ledger accounts are entered in this column.

10th. Column for total cash receipts, into which column the aggregates of the other columns are entered at the close of the day.

Payments—Cash Credits.

11th. This column is provided for inserting the folio of the ledger to which the amount is posted.

12th. The name of the account, *i. e.*, the name of the individual, firm or corporation to which money is paid. If the amount is to be carried out into the *miscellaneous column* of the cash book, then the name of the general ledger account to which the amount is charged should be inserted.

13th. The column for Local Treasurer's number: each cash payment or cash voucher should be numbered in consecutive order; the number entered in this column should also be entered upon the voucher. The vouchers should be stamped "paid" and filed away in the order in which the Local Treasurer's numbers are entered.

14th. Column for the Auditor's number entered by him on all audited bills.

15th. Explanation of the disbursement, *i. e.*, a description of the purpose for which the money was paid.

16th. All audited bills paid are entered in this column, the amount of each bill being given separately.

17th. This column provides for amounts paid to railway companies, transportation lines and foreign ticket agents, in accordance with credit balances standing upon the railway companies' ledger.

18th. The aggregate amount of drafts and advanced charge checks drawn by agents on the Local Treasurer paid each day are entered in this column; a list of the drafts and checks paid is filed with the cash vouchers each day. This list is used subsequently in separating in the accounts the drafts of agents that are paid from those that are unpaid, the latter being registered as outstanding.

19th. Miscellaneous amounts disbursed by the Local Treasurer are entered in this column, such as cash furnished to paymasters, remittances to the Treasurer of the company, payments on account of rentals; each amount being posted directly to the proper account on the general ledger. This column corresponds to the "Miscellaneous" column on the debit side of the cash book.

20th. The total cash disbursements as entered and footed in the columns described above are carried into this column at the close of each day.

The difference between the footings of the column last described and the footings of the column corresponding to it on the debit side of the cash book constitute the *Balance* of the cash book, and should agree with the balance of the cash account as posted upon the general ledger.

The cash book should be closed and the cash account accurately balanced at the end of each day's business, and no exception to this rule should be made at the close of the month or at any other time.

Each item of cash carried out into the miscellaneous columns is entered under its appropriate head in the general ledger as already described. Only the *total* footings of the other columns are posted into the general ledger, the details being entered in the subsidiary ledgers which they affect.

General Railroad News.

ELECTIONS AND APPOINTMENTS.

Bennington & Rutland.—This company, successor to the Harlem Extension, has been temporarily organized with the following directors: Benjamin R. Sears, Rutland, Vt.; Trenor W. Park, A. B. Gardner, Bennington, Vt.; Wm. H. Vanderbilt, Augustus Schell, New York.

Chicago, Burlington & Quincy.—Mr. John Sullivan, from the Fox River Valley line, has been made Road-master of the Middle Division.

Chicago, Millington & Western.—The Court has appointed James McArthur Receiver in the foreclosure suit.

Freehold & Jamesburg.—At the annual meeting in Camden, N. J., Aug. 6, the following directors were chosen: C. A. Bennett, Joel Parker, Freehold, N. J.; Isaac S. Buckalew, Jamesburg, N. J.; R. S. Conover, South Amboy, N. J.; Benjamin Fish, Lewis Perrine, Trenton, N. J.; J. N. DuBarry, Stricaland Kneass, George B. Roberts, Philadelphia.

Indianapolis, La Porte & Michigan City.—At the annual meeting in Michigan City, Ind., Aug 7, the following directors were chosen: H. H. Walker, W. G. Peck, A. R. Colborn, Michigan City; Jesse Zern, Peru, Ind.; David Macy, V. T. Malott, Indianapolis; Wm. Cutting, New York. The road is leased to the Indianapolis, Peru & Chicago.

Karns City & Butler.—At the annual meeting, Aug. 6, the following directors were chosen: J. E. Brown, R. L. Brown, H. R. Fullerton, S. D. Karns, W. C. Mobley, W. J. Parker. The board elected S. D. Karns President; H. R. Fullerton, Vice-President; W. C. Mobley, Secretary, Treasurer and Superintendent. The road is controlled by the Parker & Karns City.

Middletown & Crawford.—At the annual meeting in Middletown, N. Y., Aug. 7, the following directors were chosen: Harrison Bull, Samuel Roberson, Horace Bull, Robert M. Thompson, R. M. Crosby, Dan. Thompson, H. N. Van Kuren, I. J. Whitten, John E. Jansen, E. M. Madden, S. S. Conkling, H. R. Wilcox, Albert Bull. The board elected officers as follows: Dan. Thompson, President; E. M. Madden, Vice-President; Isaac P. Madden, Secretary and Treasurer.

New Orleans, Jackson & Northern.—The Chicago *Tribune* states that Mr. France Chandler has been appointed General Passenger and Ticket Agent. Mr. Chandler has served on the Rock Island, the St. Louis, Kansas City & Northern and the Vandalia Line, and has been for some time past Assistant General Passenger and Ticket Agent of the Illinois Central. He is a gentleman of cultivation, of wide acquaintance among railroad men, and, though comparatively a young man, there are few who have so great an experience in the passenger department.

Parker & Karns City.—At the annual meeting, Aug. 6, the following directors were chosen: J. E. Brown, R. L. Brown, H. R. Fullerton, S. D. Karns, W. C. Mobley, Fullerton Parker, W. J. Parker. The board elected Fullerton Parker President; H. R. Fullerton, Vice-President; W. C. Mobley, Secretary, Treasurer and Superintendent.

Pittsburgh & Lake Erie.—At a meeting held in Youngstown, O., last week, the following directors were chosen: James I. Bennett, John F. Dravo, Pittsburgh, Pa.; John Reeves, Beaver Falls, Pa.; C. H. Andrews, Youngstown, O.; J. H. Devereux, Reuben Hitchcock, S. Burke, Cleveland, O.

Portland & Ogdensburg.—The directors of the *Vermont Division* have elected Waldo Brigham President; John H. George, Clerk; D. D. Weed, Treasurer.

St. Louis, Fort Scott & Colorado.—The first board of directors of this new company is as follows: A. A. Harris, A. L. Fulton, Bourbon County, Kan.; J. R. Goodin, W. T. Brooks, Allen County, Kan.; D. A. Millington, Cowley County, Kan.; A. F. Eby, Elk County, Kan.; B. Dornblaser, Wilson County, Kan.; M. S. Carter, of Missouri. The office is in Fort Scott, Kansas.

Texas & Pacific.—At the annual meeting in Philadelphia, Aug. 14, the following directors were chosen: Thomas A. Scott, Frank S. Bond, John C. Brown, W. W. Keefer, H. H. Houston, R. D. Barclay, Marshall O. Roberts, Henry G. Stebbins, Wm. Thaw, W. T. Walters, Alfred Gaither, W. C. Hall, W. S. McManus, T. L. Nesmith, W. M. Harrison. The new directors are W. W. Keefer and Wm. Thaw, who succeed Matthew Baird, deceased, and Henry G. Marquand, resigned. The officers chosen for the ensuing year are: President, Thomas A. Scott; Vice-Presidents, Frank S. Bond, John C. Brown; Secretary, Charles E. Satterlee; Treasurer, George D. Krumbhaar.

TRAFFIC AND EARNINGS.

Grain Movement.

For the week ending Aug. 4 receipts and shipments of grain of all kinds are reported as follows, in bushels:

	1877.	1876.	Inc. or Dec.	P. c.
Lake ports' receipts....	3,591,829	2,854,462	Inc.. 737,367	25.8
" " shipments.	2,987,721	3,338,512	Dec.. 350,791	10.5
Atlantic ports' receipts.	2,474,726	3,895,879	Dec..1,421,153	36.4

Of the shipments from Northwestern (lake) ports, 11⅛ per cent. was by rail this year, against 38⅛ in 1876, 15¾ in 1875, and 23 in 1874. Of the receipts at Atlantic ports this year 64.9 per cent. were at New York, 11.2 at Baltimore, 8.9 at Philadelphia, 6.6 at Boston, 4.3 at New Orleans, 3.9 at Montreal, and 0.2 per cent. at Portland.

For the seven months from Jan. 1 to Aug. 4 receipts and shipments have been, flour in barrels and grain in bushels:

Flour:	1877.	1876.	Inc. or Dec.	P. c.
Lake ports' receipts....	2,325,693	3,021,516	Dec.. 695,823	26.3
" " shipments.	2,309,018	3,232,019	Dec.. 833,001	25.8
Atlantic ports' receipts.	3,705,825	5,276,512	Dec.. 1,570,687	29.8
Wheat:				
Lake ports' receipts....	11,086,658	27,135,978	Dec.. 16,059,320	59.2
" " shipments.	10,620,614	25,809,210	Dec.. 15,188,596	59.0
Atlantic ports' receipts.	6,601,859	26,101,772	Dec.. 19,499,913	74.7
Corn:				
Lake ports' receipts....	45,108,540	44,174,304	Inc.. 934,236	2.1
" " shipments..	38,854,735	40,775,549	Dec.. 1,920,814	4.7
Atlantic ports' receipts.	48,035,897	51,145,498	Dec.. 3,109,601	6.1
Grain of all kinds:				
Lake ports' receipts....	70,885,925	99,507,509	Dec.. 28,621,584	28.8
" " shipments..	60,692,553	81,314,078	Dec.. 20,621,525	25.4
Atlantic ports' receipts.	67,068,417	94,289,285	Dec.. 27,220,868	28.9

For four years the receipts and shipments of grain of all kinds have been:

	1877.	1876.	1875.	1874.
Lake ports' receipts....	70,885,925	99,507,509	74,423,302	102,307,378
" " shipments..	60,692,553	81,314,078	59,620,039	77,508,329
Atlantic ports' receipts.	67,068,417	94,289,285	66,244,536	84,590,165

On the whole, the movement this year is about equal to that of 1875, 28 per cent. less than that of 1876, and 25 per cent. less than that of 1874.

Iron Ore Movement.

Shipments of iron ore from the Lake Superior region up to Aug. 1 were as follows:

	1877.	1876.	Increase.	P. c.
From Marquette, tons.....	282,369	218,411	63,958	29.3
From L'Anse.....	215,931	158,848	57,083	35.9
From Escanaba.....	41,896	32,234	9,662	30.0
Total.....	540 196	409,493	130,703	31.9

The pig iron shipped from Marquette this year amounts to 6,707 tons. The increase in iron ore shipments is much greater than was expected.

New York State Canals.

A statement from the Canal Auditor's office gives the tonnage of the canals of New York State for July as follows, in tons:

	1877.	1876.	Inc. or Dec.	P. c.
Products of the forest....	191,342	161,312	Inc.. 29,930	18.6
Agricultural products....	172,994	106,793	Inc.. 66,201	62.0
Manufactures.....	30,001	30,190	Dec.. 189	0.6
Merchandise.....	8,995	7,612	Inc.. 1,383	18.2
Other articles.....	295,882	270,806	Inc.. 25,076	9.3
Total.....	699,114	576,713	Inc.. 122,401	21.2

Products of the forest are all lumber in various forms, except this year 705 tons of pot and pearl ashes. Agricultural products include 11,567 tons of wheat, a decrease of about 75 per cent., and 139,148 tons of corn, an increase of over 200 per cent.; pork, lard and tallow amount this year to 3,443 tons. Under manufactures the principal article this year was 18,942 tons of salt; under other articles were 166,744 tons of anthracite and 43,664 tons of bituminous coal.

Coal Movement.

Coal tonnages for the week ending Aug. 4 are reported as follows:

	1877.	1876.	Decrease.	P. c.
Anthracite.....	256,696	381,029	124,333	32.6
Semi-bituminous.....	27,107	64,938	37,831	58.3
Bituminous, Pennsylvania	11,846	34,777	22,931	66.0

Coal shipments during the week were largely prevented by the strikes.

The strike among the miners in the Wyoming and Scranton anthracite regions continues. In the Schuylkill region the men are generally at work and production continues large.

The blockade of the Chesapeake & Ohio Canal by strikers has been broken, but most of the boatmen still refuse to work unless freights are raised to $1 per ton between Cumberland and Georgetown.

Bituminous and semi-bituminous tonnages not heretofore reported for the seven months ending July 31 were:

	1877.	1876.	Inc. or Dec.	P. c.
East Broad Top.....	29,136	40,660	Dec.. 11,524	28.3
Bellefonte & Snow Shoe.....	23,687	31,260	Dec.. 7,573	24.2
Allegheny Region, Pa. R. R.....	109,411	118,410	Dec.. 8,999	7.6
Penn and Westmoreland gas coal	399,745	428,983	Dec.. 29,238	6.8
West Penna. R. R.....	104,303	112,915	Dec.. 8,612	7.6
Southwest Penna. R. R.....	22,551	33,719	Dec.. 11,168	33.1
Pittsburgh Region, Pa. R. R....	203,271	160,280	Inc.. 42,991	26.8
Total.....	892,104	926,227	Dec.. 34,123	3.7

The July tonnages are generally light, chiefly owing to the impossibility of making shipments during the railroad strikes.

Railroad Earnings.

Earnings for various periods are reported as follows:

Year ending May 31:	1876-77.	1875-76.	Inc. or Dec.	P. c.
Texas & Pacific.....	$2,381,976	$1,564,625	Inc.. $817,351	52.2
Expenses.....	1,352,446	891,882	Inc.. 460,564	51.6
Net earnings.....	$1,029,530	$672,743	Inc.. $356,787	53.0
Earnings per mile.	5,754	4,814	Inc.. 940	19.5
Per cent. of exp'ses.	56.78	57.00	Dec.. 0.22	0.4

Seven months ending July 31:	1877.	1876.	Inc. or Dec.	P. c.
Bur., Cedar Rapids & Northern.....	$501,958	$660,655	Dec.. $158,697	24.0
Canada Southern.....	1,032,275	948,679	Inc.. 83,596	8.8
Central Pacific.....	9,066,000	9,568,167	Dec.. 502,167	5.2
Chicago & Alton.....	2,341,902	2,650,372	Dec.. 308,470	11.6
Cleve., Mt. Vernon & Delaware.....	208,669	211,786	Dec.. 3,117	1.5
Denver & Rio Grande.	378,093	243,972	Inc.. 134,121	55.0
Illinois Central, Ill. lines.....	2,549,119	3,060,661	Dec.. 511,542	16.7
Indianapolis, Bloom. & Western.....	664,122	858,038	Dec.. 193,916	22.6
International & Great Northern.....	746,481	639,517	Inc.. 106,964	16.7
Midland, of Canada...	140,095	146 348	Dec.. 6,253	4.3
Missouri Pacific.....	2,074,502	2,004,242	Inc.. 70,260	3.5
St. Louis, Alton & T. H., Belleville Line..	269,431	265,088	Inc.. 4,343	1.6
St. Louis, Iron Mt. & Southern.....	2,224,541	1,976,973	Inc.. 247,568	12.5
St. Louis & San Francisco.....	708,966	699,079	Inc.. 9,887	1.4
Toledo, Peoria & Warsaw.....	572,863	786,051	Dec.. 213,188	27.1
Wabash.....	2,259,530	2,368,096	Dec.. 98,566	4.2

Six months ending June 30:				
Bur., Cedar Rapids & Northern.....	$428,649	$589,235	Dec.. $160,586	27.3
Net earnings.....	86,956	148,761	Dec.. 61,805	41.5
Per cent. of exps....	79.72	74.78	Inc.. 4.94	6.6
Cleve., Mt. Vernon & Delaware.....	184,185	184,200	Dec.. 15	....
Net earnings.....	34,441	30,441	Inc.. 4,000	13.1
Per cent. of exps...	81.38	83.56	Dec.. 2.18	2.6
Hannibal & St. Joseph	928,108	904,702	Inc.. 23,406	2.6
Kansas Pacific.....	1,346,045	1,364,057	Dec.. 18,012	1.3
Net earnings.....	541,562	486,153	Inc.. 55,409	11.4
Per cent. of exps...	59.77	64.36	Dec.. 4.59	7.1
Nashville, Chatta. & St. Louis.....	810,993	876,636	Dec.. 65,643	7.5
Net earnings.....	312,926	330,592	Dec.. 17,666	5.3
Per cent. of exps...	61.41	62.29	Dec.. 0.88	1.4
Paducah & Memphis.	86,309	106,054	Dec.. 19,745	18.6
Net earnings.....	22,352	35,825	Dec.. 13.473	37.6
Per cent. of exps...	74.11	66.25	Inc.. 7.86	11.9
St. Louis, Iron Mt. & Southern.....	1,932,141	1,719.386	Inc.. 212,755	12.4
Net earnings.....	801,451	646,708	Inc.. 154,743	23.9
Per cent. of exps...	58.52	62.40	Dec.. 3.88	6.2
St. Louis & San Francisco.....	612,542	611,310	Inc.. 1,232	0.2
Net earnings.....	313,770	231,315	Inc.. 82,455	35.6
Per cent. of exps...	48.78	62.16	Dec.. 13.38	21.5
St. Paul & Sioux City.	207,659	262,297	Dec.. 54,638	20.8
Net earnings.....	45,990	80,710	Dec.. 34 720	43.0
Per cent. of exps...	77.84	69.23	Inc.. 8.61	12.4
Sioux City & St. Paul.	113,282	162,719	Dec.. 49,437	30.4
Net earnings.....	10,804	32,506	Dec.. 21,702	66.8
Per cent. of exps...	90.45	80.03	Inc.. 10.42	13.0
Union Pacific.....	5,992,409	5,645,933	Inc.. 346,476	6.1
Net earnings.....	3,506,938	2,973,160	Inc.. 532,878	17.9
Per cent. of exps...	41.50	47.34	Dec.. 5.84	12.3

Month of June:				
Hannibal & St. Joseph	$165,449	$141,426	Inc.. $24,023	17.0
Union Pacific.....	1,101,099	1,154,314	Dec.. 53,215	4.6

Month of July:				
Bur., Cedar Rapids & Northern.....	$73,309	$71,420	Inc.. $1,889	2.6
Canada Southern.....	124,649	115,798	Inc.. 8,851	7.6
Central Pacific.....	1,366,000	1,541,222	Dec.. 175,222	11.4
Chicago & Alton.....	310,160	403,671	Dec.. 93,511	23.2
Cleveland, Mt. Vernon & Delaware	24,484	27,586	Dec.. 3,102	11.2
Denver & Rio Grande.	75,233	39,120	Inc.. 36,113	92.4
Illinois Central, Ill. lines	369,630	380,495	Dec.. 10,865	2.9
Illinois Central, Iowa lines.....	89,077	114,034	Dec.. 24,957	21.9
Ind., Bloom. & West'n	84,726	88,507	Dec.. 3,781	4.3
International & Great Northern	89,500	72,406	Inc.. 17,094	2.4
Missouri Pacific.....	267,044	252,313	Inc.. 14,731	5.8
St. L., Alton & T. H., Belleville Line.....	31,738	29,564	Inc.. 2,174	7.3
St. Louis, Iron Mt. & Southern	292,400	257,587	Inc.. 34,813	13.5
St. Louis & San Francisco.....	96,424	87,769	Inc.. 8,655	9.9
Toledo, Peoria & Warsaw	74,359	92,666	Dec.. 18,307	19.7
Wabash.....	273,767	271,978	Inc.. 1,789	0.7

First week in August:				
Atchison, Topeka & Santa Fe.....	$48,734	$47,315	Inc.. $1,419	3.0
Missouri, Kansas & Texas	65,174	62,350	Inc.. 2,824	4.5

A Bathing Car.

An exchange says: "The Turkish bath will be introduced on railroad trains. Charles H. Cooper, of Watertown, N. Y., has patented a car for this purpose. The internal arrangement is a parlor or drawing-room, 10 by 15 feet; Russian and plunge bath, 8 by 7½; three shampooing rooms, 6 by 7½; tepidarium, 10 by 23; movable closets, 2½ by 10; passages 18 inches wide. The temperature in the various rooms will vary from 80 to 160 degrees. The whole is lighted by blue glass. The idea of the inventor is that the car may be used on trains or side-tracked at towns where no such establishments are in operation. The entire process of the Turkish bath is to be practiced—from the hot room to the shower bath, plunge and cooling down."

RAILROAD GAZETTE

Published Every Friday.

CONDUCTED BY

S. WRIGHT DUNNING AND M. N. FORNEY.

CONTENTS:

	Page.		Page.
ILLUSTRATIONS:		EDITORIAL NOTES	379
Rail Joints	371	NEW PUBLICATIONS	379
Mogul Locomotive (Brooks)	372	GENERAL RAILROAD NEWS:	
CONTRIBUTION:		Train Accidents in July	373
Regulations for Cash Remittances	374	Elections and Appointments	375
EDITORIALS:		Traffic and Earnings	375
Five Railroads with Business Enough for Two	376	Personal	380
An Accident that Ought not to have Occurred	376	The Scrap Heap	380
The Grain Movement	377	Railroad Law	380
The Chicago & Northwestern Report	377	Old and New Roads	380
The Rights and Wrongs of Strikes	378	ANNUAL REPORTS:	
The Master Mechanics' Association Report	379	Chicago & Northwestern	381
Record of New Railroad Construction	379	Rutland	382
Brooklyn Excursion Railroads	378	Chicago & Michigan Lake Shore	382
		MISCELLANEOUS:	
		Tests of Rail Joints	371
		How to Run a Locomotive	371
		Specifications of a Mogul Locomotive by the Brooks Locomotive Works	373

Editorial Announcements.

Passes.—*All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.*

Addresses.—*Business letters should be addressed and drafts made payable to* THE RAILROAD GAZETTE. *Communications for the attention of the Editors should be addressed* EDITOR RAILROAD GAZETTE.

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

FIVE RAILROADS WITH BUSINESS ENOUGH FOR TWO.

When there was some conflict between the trunk lines a few months ago, and it seemed probable that there would be another railroad war, Mr. Wm. H. Vanderbilt is reported to have said that the trouble was that there were five railroads and only business enough for two. As a statement of the circumstances which always tend to induce the trunk lines to underbid each other for through traffic, this was very well. The capacity of the roads to carry such traffic is greatly in excess of the existing traffic. But Mr. Vanderbilt's pithy statement has been used as a text by several journals which have concluded therefrom that under the circumstances it is inevitable that the trunk lines should carry at unprofitable rates.

It is generally true that most industrial enterprises—if there are many of them and their capacity for production greatly exceeds the demand—will compete for the supply of the market until the margin over cost of production is reduced so far as to leave a most unsatisfactory return on the capital invested, or perhaps none at all. Is this equally true of railroads, and necessarily so? Unless there is business enough for all the railroads, must they accept competitive traffic at unprofitable rates?

To ascertain this we need to find an answer to this question: What is business enough for a railroad? We need to consider this well, for the answer involves one of the distinguishing features of railroad transportation, a feature in which it differs from nearly all other kinds of business. We mean, ordinarily, when we say that an establishment has business enough, that it has all it can do; that any increase in production would necessitate something like a corresponding increase in the instruments of production—if it is farming, then in the land, the buildings, the stock and machinery, and generally a corresponding increase in the capital invested. An industry has business enough when the capital invested is fully utilized.

Now consider the case of a railroad. Was one ever known to be fully utilized? It is common enough for a road to have all its rolling stock fully occupied for part of the year; but the rolling stock is, in cost, but a small fraction of the whole apparatus with which it does its work. In these busiest times its tracks, the costliest part of it, are probably not occupied a tenth part of the time: even if fully occupied, their capacity could be increased by an expenditure of capital small in proportion to the increased capacity and to the cost of the original road.

It is doubtful if there is such a thing as a fully occupied railroad. The Metropolitan, one of the London underground lines, is doubtless the nearest to it, but year after year its traffic goes on increasing, although its passenger traffic per mile of track is greater in a week than the New York Central's in its busiest year.

The proprietor of a railroad may very likely say that his road has "business enough" when it makes a satisfactory profit on its cost from its business. This, however, is not the kind of "business enough" which prevents ruinous competition. The trunk lines were all paying 8 to 10 per cent. dividends previous to 1874. They have more business now than they had then, and have had every year since, but that has not prevented several ruinous railroad wars, in which rates were reduced below the bare cost of transportation. But several railroads with less than half of their business have continued to earn good dividends and have scarcely ever carried at unprofitable rates, though often, doubtless, for less than they desired.

Consider the case of a new railroad with a single track, one locomotive and cars enough to make a mixed train. It will not take much to give this road business enough to occupy its rolling stock fully; but then the road will be occupied less than a hundredth part of the time. Another engine and a few more cars, and perhaps a few feet of side track, again give it a capacity greatly in excess of the demand, and this continues until at length there may be more traffic than can safely be got over a single track. But the construction of a second track, while more than doubling the capacity of the road, probably does not increase its cost by more than a fifth, and so the capital expenditure for the additional traffic needed to fully employ the second track is but a trifling addition to the working expenses. As traffic grows further a third track and perhaps a fourth may become necessary; but the capacity of the road is increased several times thereby. Thus the temptation to attract additions to traffic is hardly checked at all by the cost of providing accommodations for such additions. This is a general truth when the additions are or appear to be permanent, but not when they are temporary. A company will not probably even provide rolling stock for a sudden spurt of traffic lasting only a week or so; but it will almost always construct a new track and supply all needed rolling stock for what is expected to make a steady demand on its capacity. The additional expenditure per additional daily train is comparatively small until the track capacity is exceeded, and then very large for the next train, of course; but the differences are not so great as might be expected, for an increase of trains requires an increase of sidings; and when a second track becomes indispensable, a large part of it is already formed by these sidings. On the average the expenditure for rolling stock is increased almost in proportion to the increase in traffic, but the expenditure for road, stations, etc., increases in nothing like that proportion; and generally the cost of providing for increases of traffic is in fact so small that it plays but a very small part in the calculations of railroad managers, who generally assume, and are right in assuming, that they have not business enough and that they never will have business enough; that, in fact, the cost (including interest on investment) of carrying additions to the existing traffic will be very much less than the average cost of carrying the existing traffic; and this it is which leads companies to make great efforts to increase their business, whether by developing new sources of traffic, or by taking business from rival roads. And this has its effect when there are two railroads with business enough for all their rolling stock, as well as when there are "five railroads and only business enough for two," though of course the effect is not at once so great. And it exists and has its effect when there is one railroad with more business than it can at the time accommodate, though of course this effect does not extend to reducing the price of transportation to unprofitable rates. What it does then is to impel the proprietors of the road to get rolling stock and add sidings and tracks and other facilities not only until the traffic offering is fully accommodated, but also until they can accommodate any additions of traffic that may be developed by special exertions, or by such reductions of rates as will not affect the old traffic and will still leave a profit. That is, the owner of a railroad, as of other property, finds it to his interest fully to utilize his possession. But his property is of such a nature that it is almost impossible to get business enough to employ all parts of it fully. It is usually many years before traffic enough can be had to utilize the single track as fully as is safe; then when a second track is laid both must lie idle most of the time, even with a largely increased traffic, and generally it is true that:

First, in order to have a railroad at all, it is necessary to supply an apparatus the costliest part of which has a capacity vastly in excess of any probable demands upon it, and

Second, that nearly every railroad is or can easily be made capable of accommodating large additions to its traffic with comparatively trifling additions to its structures and their cost.

It will only be when on all the tracks of a railroad full trains are running as frequently as they can safely, day and night, that the road can be said to be fully utilized. We do not know where to find such a railroad, and very few lines in this country can have anything like such a traffic in our day.

It is doubtless true that one of the roads between New York and Chicago would be able to carry all the immense through traffic between those places, together with its own local traffic, without much addition to its tracks and other road appliances, and it could, in such case, carry this freight much cheaper than is now done by the several lines, none of which are anything like fully occupied. Are there then too many trunk railroads? That inference has been drawn in discussions of the subject, but it is wholly unwarranted. Doubtless some of the roads have increased their capacity in excess of the demand on them, and of course some of the loop lines and many of the branches of the trunk lines between Chicago and New York could well have been spared. But which of the trunk lines is superfluous? Which one could be spared a year? Which, if utterly destroyed to-day, would not be replaced as fast as men and money could do it? Five roads are not needed to carry the through traffic between New York and Chicago, it is true; but they are indispensable for the accommodation of the country along the lines. Take every ton of through traffic from the New York Central & Hudson River and it would still be one of the most important of American railroads, and so with most of the other trunk lines: aside from their through traffic between the seaboard and the Northwest they have enough other traffic to place them among the most important railroads of the world. Doubtless if they had never attempted to provide for the through traffic they would have absorbed much less capital; but the country needs every one of them, and doubtless the local traffic would pay the entire interest on their present cost if it could not otherwise get the use of the roads.

And the effect of the division of the through traffic among all the trunk lines, when a single one could carry it at less cost, is that while the through traffic is carried at greater cost to the roads and possibly (not probably) with higher charges to the community, the local traffic is carried at less expense and for lower rates. Instead of having one road with an enormous traffic and a narrow belt of country along it served very cheaply, we have half a dozen roads with a large traffic and the entire belt of country through which they pass served at moderate rates.

If there is not business enough for the trunk lines, then no railroad in America has business enough, for none except some short coal roads has so heavy a traffic. If a trunk line with forty daily trains each way suffers for lack of business, what shall we say of the Pacific railroads, with two through trains daily? It is true that the capacity for transportation on the trunk lines greatly exceeds the demand on them; but that is true also of all other railroads, and, as we have endeavored to show above, is a necessary attribute of this instrument for transportation, the attribute which distinguishes it sharply from most other enterprises, which makes its business peculiar, and which, especially, makes it proper and necessary, for the best good of the community and the carriers alike, that the prices for their services should not depend solely on unrestrained competition. Ordinarily, free competition causes the supply to equal and in the long run not greatly to exceed the demand. In railroad business, as we have endeavored to show, it is inevitable that the supply should exceed the demand. In the other great system of transportation—over navigable waters—competition works effectively. Here only the vessels—the equivalent of railroad rolling stock—have to be provided. But in railroad transportation capital has to provide the sea as well as the ships, and if it is easier to crowd a track with trains than to crowd the sea with ships, it is still not easy; and in nearly all places where railroads have been built it is quite impossible.

An Accident that ought not to have Occurred.

On Thursday, Aug. 9, part of a passenger train on the Long Branch Division of the Central Railroad of New Jersey got off the rails in crossing a draw-bridge at Oceanport. Several of the cars were thrown off the bridge and a large number of persons were injured, two or three of whom have since died. The cause of the accident was either that the bridge was not entirely closed when the train reached it, or that it was not locked by the bolt provided for that purpose after it was closed. The engine and tender passed safely over, but after the accident the bridgeman testified, at the coroner's inquest, "that the latch (or bolt) was then about two-thirds open, and the bridge was about ten inches off," which would indicate that the bridge had been opened by the motion of the train in passing over.

Now if the lesson taught many years ago by the Norwalk

disaster had been observed, and the train had been stopped before crossing, in all probability its motion in passing over the bridge would have been so slow that no injury or damage would have occurred.

In the next place, if the bridge signals had been provided with an interlocking apparatus, it would have been impossible for the bolt to have been in the position in which it was found after the accident, without having a danger signal set, which would have stopped the train. In order to be specific, we will refer to a draw-bridge on the Hudson River Railroad at Spuyten Duyvel, which, as New York readers will know, is at the extreme northern end of Manhattan Island. This bridge is provided with an interlocking system of signals, which makes it impossible to withdraw the bolt which locks the bridge without *first* raising a danger signal. That is, the bolt itself is *locked* fast until this signal is raised, and is unlocked by the act of raising the signal, and cannot be withdrawn until then, after which the bridge can be opened. After it is open it is then impossible to *lower* the danger signal to indicate "line clear" so long as the bridge remains open; and before the signal can be lowered, the bridge must not only be closed, but it must be locked. The movement of the bolt in locking the bridge *unlocks* the signal, and permits it to be lowered. It will thus be seen that it is impossible for the bridge tender *not* to raise a danger signal unless the bridge is properly closed and *bolted*. With such an apparatus, which is not very expensive, accidents like that which occurred at Oceanport could not happen, unless the locomotive runner should disregard the signal. Such an apparatus eliminates entirely the most prolific cause of accidents at draw-bridges, which is the mistake of the bridge-tender in giving signals or in locking the bridge. Even the danger that the locomotive runner will not observe the signals can be very much reduced, by using, besides the signal at the bridge, a distant signal placed 1,000 or more feet from it.

We have no means of knowing how the floor of the Oceanport bridge was constructed, but the cross-ties in the floors of all railroad bridges should be laid so close together that the wheels of a car or engine will roll over them without difficulty in case of getting off the rails. Not only should this be the case, but it is of the utmost importance that the cross-ties should be fastened so that in case of accident they will not be pushed together, and thus let the car or engine fall through. A slight accident to the train, such as the breaking of an axle or the attachments of a brake beam, may have this effect on the cross-ties. They can be securely fastened by placing blocks between them, or notching in longitudinal stringers.

There are few engineers now, who have any care for their own reputations or the lives of their passengers, who do not provide guard rails on all bridges. These are carried out some distance beyond the abutments of the bridge, and then united in a > form between the rails, so that if a train gets off the track before it reaches the bridge, it will be guided to the centre of the bridge, and thus be prevented from running against the end posts and destroying the bridge. But it is obvious that even with guard rails it is possible for the wheels of a car or engine to get off the track, and in a position shown in fig. 1. In that case, there is nothing to prevent the wheels from running towards the right side until the left wheel comes into contact with the right guard rail. Before this occurs the car body would probably come in contact with the truss, if the accident should happen on a through bridge. Now as additional protection longitudinal wooden stringers, *A A*, are placed on the outside of the rails about 8 to 12 in. from the latter. These will effectually guide the wheels, in case they get entirely off the rails, and prevent them from running sideways further than a certain distance. It is of course important that the cross-ties, *B B*, should be supported not only on stringers, *C C*, under the rails, but also at their outer ends, *D D*, so that the ties will not tip up if the weight comes on the outside. On such a floor if one or more pairs of wheels should get off the rails on a bridge they would run a long distance without much danger, if the wheels were kept in line with the rails. If, however, the truck of a car should turn or "slew" around so that it would come crosswise of the track, then of course there would be a disaster. It is therefore, even with the best bridge floor possible, of the utmost importance that the trucks should be kept in line with the rails. It may be said that longitudinal stringers and guard rails, like those represented in the engraving, would prevent the trucks from "slewing," which is perhaps true if only one pair of wheels should get off the track. If, however, one pair should get off on one side of the rails and another pair on the other side, the trucks could turn so much that the wheels would not roll over the cross ties in a longitudinal direction with the bridge. Even if the trucks should be safe on a floor like that represented, they would not be if they got off the rails on the approaches to the bridge. Car and engine trucks should therefore always be provided with strong check or safety chains at each of the four corners of the truck to hold them in line in case of getting off the rails. Without this provision, even the best construction of bridge floor may be liable to accident. The security they give in other localities, such as on high embankments, in cuts, and in fact at all places on a road in case of accident, should, it is thought, compel their univeral use.

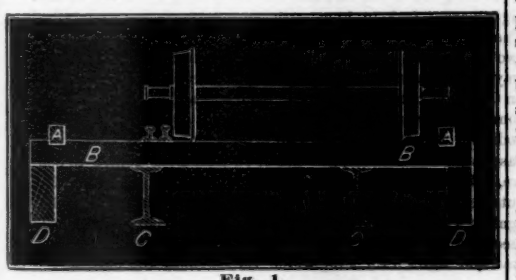


Fig. 1.

Without any clear and accurate knowledge of the character of the Oceanport bridge floor, or of the cars which were in the train at the time of the accident that occurred at that place, it would of course be rash to say that it was due to the bad construction of any of these. But we do know the fact, however, that a very large proportion, if not all, of the cars on the Central Railroad of New Jersey are run without safety chains, and it can also be said that with the floor of a bridge constructed as indicated, and with safety chains which are strong enough to be worthy of the name, such an accident as the one referred to in this article would be very unlikely to occur.

Perhaps something should be said here of the criminally careless and ignorant way in which safety chains are often attached to cars and trucks. If such chains mean anything they mean that in certain critical moments they may be the sole reliance on which the lives and limbs of hundreds of people may be dependent. If at such a time their strength is greater than the strain they must bear, all will be well; if, through the indifference or stupidity of the master car-builder who has put them on, they are not strong enough, then death in its most appalling form, and pain more excruciating than can be imagined, may be the result of that mental or moral obtuseness which will not disturb itself to think. There are hundreds of cars running all over the country with safety chains which the master car-builder who put them on would not feel to be strong enough to secure a mad bull, if his own body were exposed to the danger of his fury, and yet the men who are responsible for their malconstruction subject innocent men, women and children to danger ten times more terrible than that of any infuriated animal, until one longs for the gift of vituperation which Horace Greeley had, so as to be able to call them hard names adequate to the occasion.

The Grain Movement.

Although there has been quite a revolution in the grain movement from the Northwest this season, a revolution which has restored to the water route its former supremacy, which had only been interrupted and not at all destroyed by the exceptionally low rail rates made during the railroad war of 1876, the changes in the receipts at Atlantic ports have been comparatively small. It was to be expected that when the railroads made no attempt to compete with the water rates, New York, the Atlantic terminus of the chief water route, would have a much larger proportion of the total receipts; and that if any other port should profit by the cessation of railroad competition it would be Montreal, the terminus of the other water route by which exports are made. A comparison of the receipts at the several ports since navigation opened shows the facts to have been as follows:

Receipts of Grain of all Kinds for the Sixteen Weeks since the Opening of Navigation, April 15 to Aug. 4.

	1877.		1876.	
	Bushels.	P. c.	Bushels.	P. c.
New York	18,166,586	45.5	29,436,002	46.2
Boston	3,112,079	7.8	4,608,654	7.2
Portland	212,564	0.5	704,818	1.1
Montreal	3,701,778	9.3	5,999,362	9.4
Philadelphia	4,933,490	12.4	12,010,150	18 9
Baltimore	7,241,690	18.1	8,999,335	14.3
New Orleans	2,566,802	6.4	1,882,215	2.9
Total, 16 weeks.	39,934,689	100.0	63,640,596	100.0

Here we see that New York has not profited by the unquestioned supremacy of the water route, as might have been expected. It has, indeed, received not quite so great a proportion of the total as it did last year. The same is true of Montreal. There has been great loss at Philadelphia, which has been nearly made up by an increase at Baltimore, the two places taking 30.5 per cent. of the total Atlantic receipts, against 33.2 last year. New Orleans has largely increased its proportion (from 2.9 to 6.4 per cent. of the whole) and is the only port which has an increase in the *amount* received.

Two facts have modified the course of the grain movement this year. The first is the light exports: the grain was mostly needed for home consumption, and therefore its destination was governed more by the consumptive demand than by the export demand at the several ports. The other fact is the existence of contracts between the railroads and Northwestern shippers by which, until July, grain was taken by rail at last year's low rates. This, it is easy to see, may have modified considerably the distribution of receipts at the different ports. It appears that for the eleven weeks from April 15 to July 30, New York received but 42 per cent. of the total receipts at the Atlantic seaboard, although all this time the rail rates, except on shipments made under last year's contracts, were much higher than the water rates. But during the five weeks since June New York has got 54 per cent. of the whole; and during the same five weeks the proportion of Baltimore has been 10½ per cent. (against 21 per cent. during the eleven weeks previous). Thus, apparently, as soon as the advantage of the water rates became applicable to all grain shipped, by the expiration of the old contracts, New York received part of the traffic which had been diverted to Baltimore when and as long as rail rates were as low as water rates. And this same expiration of contracts for low rail rates has probably much to do with the advance in water rates. It can hardly be said that the railroads have bid against the lake vessels this year for the carriage of grain. But the contracts which they made last year so greatly decreased the amount of grain left to the vessels to carry that the latter competed with each other to an unusual extent until the railroads ceased to carry any considerable amount of grain. This is shown by the following, in which the shipments by lake and rail from the Northwestern markets for the eleven weeks from the opening of navigation to the end of June are compared with the shipments for the five weeks since June:

Bushels shipped—	By Lake.	By Rail.	Total.	P. c. by rail.
April 15 to June 30	19,241,742	10,866,246	30,107,988	36.1
July 1 to Aug. 4	12,633,121	2,469,408	15,102,529	16.3

The average shipments per week for the two periods were, in bushels:

	By Lake.	By Rail.	Total.
April 15 to June 30	1,749,249	987,841	2,737,090
July 1 to Aug. 4	2,526,624	493,882	3,020,506

There has been, it is true, some increase in the total amount of shipments—some 11 per cent.; but not enough surely, to sustain the advance of lake rates from 1½ to 3½ cents per bushel—133⅓ per cent. It is the withdrawal of the railroads from the traffic which has done so much to make the demand for vessels so nearly equal to the supply. The railroads are taking on an average but half as much as they took before July, though there has been no increase in the rates at which they have made new contracts this year, while lake rates have doubled. But this, with the small increase in the average weekly shipments, has given the vessels 50 per cent. more to carry than they had before July—a very material increase.

This, then, will explain why when lake rates were 1½ cents a bushel to Buffalo and railroad rates apparently 16.8 cents to New York, the railroads still got 36 per cent. of the traffic; while now that the lake rates are 3½ cents and railroad rates unchanged, the railroads get but about 16 per cent. of it.

The Chicago & Northwestern Report.

The very first sentence of the report of this company for the year ending with May last gives that particular piece of information most interesting to the stockholders to whom the report is made, but which in very many reports is nowhere directly stated, but has to be found by sundry calculations more or less laborious. "The net result of the operations of the Chicago & Northwestern Railway Company," says President Keep, "including the operations of its proprietary roads, shows a profit of $1,078,226.27 for the last fiscal year." Doubtless there are shareholders who will not care to read further. They only wanted to know what the net profits of their property were, and this has told them. There was almost exactly enough to pay 5 per cent. on the preferred stock, one-half of which was actually divided.

But though the report gives thus briefly and prominently what the most careless stockholder will be content with, it does not neglect those who wish to make a study of the operations of their road, and examine into the sources of earning and the various items of expenditure, and endeavor to ascertain whether the latter were justifiable, or have been sufficient to fully maintain the condition of the property. The accounts of expenses are especially minute, and are compared, item for item, with those of the previous year, and are further illustrated by a statement showing the percentage of each item of expenses to the total expenses for each year. Renewals and new construction are separately described in detail, giving quantities as well as cost. A detailed statement of the funded debt enumerates each of the 22 different issues of bonds on which the company pays interest, showing the amount of each outstanding, the rate of interest, dates when coupons and when principal are due. The proprietary roads excepted, the material for examination of the operations and conditions of the company are quite full and are well presented. Details of earnings and expenses for each line of the proprietory roads are not given, but their effect as a whole on the profits of the company is shown by the charge against them for the excess of interest on their bonds over their net earnings.

The Chicago & Northwestern is a great wheat road, and its business could not but be largely affected by the failure of the wheat crop of 1876 in Wisconsin and Minnesota. The new crop in these States does not usually begin to move in considerable quantities until well into September, and so the last fiscal year of the Chicago & Northwestern may be said to cover four months of the good crop of 1875 and eight months of the bad one of 1876. Actually, however, the earn-

ings for the first half of the fiscal year compared quite favorably with those for most corresponding half-years. The great falling-off was in the last half of the year, when it was more than 11 per cent.

But after all the earnings were less affected than was to be expected, the total decrease in receipts on the whole system worked being just about 7 per cent. The fact that more than a third of the mileage worked is in Illinois and Iowa, where the crops are more varied than further north, and that another considerable portion is supported almost exclusively by iron ore traffic, prevented the failure of the wheat crop from affecting this road as much as some others.

The decrease of earnings of 7 per cent., amounting to $980,000, was nearly balanced by a decrease of $879,000 in working expenses and fixed charges, chiefly due to the very large decrease of 11.7 per cent. on the Chicago & Northwestern proper (exclusive of the proprietary roads). The table of expenses in detail, which we copy in our summary of the report, shows where these savings were chiefly made. A large part was in maintenance expenses, which were reduced, in all, 12.8 per cent., which, however, is but little more than the average reduction. Nearly a quarter of the whole saving was in fuel, in which false economy is almost impossible. The renewals of rails are specified, and amount to about 9 per cent. of the total mileage of road, and to 12 per cent. of the mileage which was not laid with steel at the beginning of the year. The new ties laid appear to have been sufficient to renew about one-seventh of the entire stock, which should be about equal to the average depreciation.

This road (to whose accounts we hope to return) is one of those which will be most benefited by the great crops now being harvested. The fact that it has been able to make 5 per cent. on the preferred stock during a year which was extraordinarily unfavorable to its traffic certainly gives its proprietors reason to hope for an excellent result from the current year, when, with the elements of expenses greatly reduced as they are, there is promise of a magnificent traffic.

The Rights and Wrongs of Strikes.

One of the effects of any great social agitation, like the recent strike, is to induce people generally to look into the relative rights, duties, privileges and obligations which the parties concerned in such disturbances may or should exercise or perform. It may safely be said that there never was a time when the labor question and trades-unions were discussed as much, in this country, as they are now. That good will result from this there can be little doubt, and although there has been some wild talking, and some loose writing on the subject, generally the discussion has, we think, led to a clearer understanding of the rights and duties both of the strikers and those who were struck.

There is, however, one absurd idea which, from the following dispatch to one of the daily papers, it will be seen, is still entertained by at least one railroad superintendent. The dispatch was as follows, all names being omitted:

"The committee appointed by the striking train-men of the —— division of the —— Railroad at their meeting last night waited upon Superintendent —— to-day. Mr. —— refused to receive them *as a committee*, but intimated that he was ready to consider the application of any man who desired employment under the company." Now why should not Superintendent —— receive a number of men "as a committee." If he did, is there any reason why he should lose any of his self-respect, or surrender any of the dignity or authority which attaches to his office? Or is he so wrapped up in a sense of his own self-importance that he is unwilling to meet on equal terms a number of working-men who call themselves a committee? If so, then the "tone" of the man is quite too high for the position he holds. It is not believed that any of these are the true reasons why railroad officers, as they sometimes do, refuse to receive committees, but that it is from some vague and foolish idea that by so doing they would, in an indefinite way, be surrendering somewhat of their authority or power over their men, or that, by some means, a "recognition" of a committee gives to the organization which it represents rights and privileges which it would otherwise not possess. Evidently this idea, like the phraseology, is borrowed from that which prevails in the relations between nations, but when one nation "recognizes" another it confers some rights and assumes some obligations. Recognizing or "receiving" a committee, however, means simply that a railroad officer will sit quietly in his office and hear respectfully what the members of that committee have to say, and if he chooses he may say something in reply. By doing so he does not assume any obligations or confer any rights and privileges on the organization which the committee represents, unless the person who receives the committee chooses to assume such during the interview. This refusal on the part of railroad officers to receive committees is, we believe, the result of a purely imaginary and childish apprehension that some right will be relinquished or privilege conferred by such an interview. Now, it may seem absurd to discuss this soberly, but several strikes which have occurred during the last few years were, it is believed, the direct result of the refusals of railroad officers to "receive" committees and hear their grievances, which often can be set right without much difficulty. Such refusal has been the most frequent cause of complaint from the Brotherhood of Locomotive Engineers, and there is nothing which most people will resent so quickly as to be refused an interview when one is sought, unless some good reason or excuse is given. When decent people refuse to see those who call to see them, it is usually interpreted that the person refusing regards the person refused as in some way morally or socially unworthy of recognition. When a committee of workingmen is refused an interview, it is as certain that they will be filled with bitterness and resentment as it would be that you, the reader, would feel the same way if you called on the same person.

Considering the harm which has been done by this preposterous feeling of non-intercourse with committees, it is gratifying to see that some of the most prominent railroad men recognize the folly of it. Thus in his letter to the employes of the Pennsylvania Railroad, Mr. Scott said: "This company has always given a prompt hearing to any complaint, and I can safely say that no employe *or committee* of employes of the company has ever been denied by me a respectful consideration of any alleged grievance."

It is also reported in the papers, and is doubtless correct, that Mr. Newell, General Manager of the Lake Shore Railroad, agreed with a committee of the strikers at Collinwood upon terms for a resumption of work, of which the following was the first: "The company in the future *will listen to* and adjust if possible all grievances of the workmen."

We have in a previous article called attention to the fact that a strike conducted by a well organized trades-union is not nearly so likely to cause injury to property or life as one which is led by an unorganized mob. If, therefore, railroad officers instead of refusing to "receive" committees will give them "a respectful consideration," we believe that one prolific cause of strikes will be removed, and the way be open to a very efficient means of avoiding many of them.

Brooklyn Excursion Railroads.

II.

Last week we gave an account of three railroads of standard-gauge serving chiefly for the carriage of passengers from Brooklyn to the sea beach on the south shore of Long Island. We this week give some account of a narrow-gauge road built for the same traffic but of 3-ft. gauge—a line which was only opened last month but which has already developed a large traffic.

Before beginning this description, however, it may be well to try to explain why it is that so many routes are supported by the traffic to Coney Island, and how a new route can immediately develop a traffic of some ten or twelve heavy trains daily, without, apparently, seriously affecting the traffic of the two older roads.

Coney Island, then, extends along the coast of Long Island for a distance of some five miles from east to west, the west end being perhaps 2¼ miles from the southern entrance of the "Narrows," which is the channel leading to New York Bay. The only part of it accessible by steamboats is this west end. The journey by steamboat through the upper bay of New York and the Narrows is a most beautiful one, and in summer is especially attractive by its coolness. But the west end of the island was formerly considered hardly a respectable resort; and though it is now much improved, its old reputation still clings to it; and whether respectable or not, it is certain that the greatest number of good restaurants, the aquarium, and other popular resorts, are at the middle of the island, where the Prospect Park & Coney Island has its terminus, and near the terminus of the Brooklyn, Bath & Coney Island Railroad. These roads make this part of the island sufficiently accessible to the people of Brooklyn; but to reach their Brooklyn termini from the residence portion of New York a journey of an hour to an hour and a half is required, including two trips in horse cars. So though Coney Island was accessible enough to New York, by a quick and pleasant route, the most popular part of the island was easily accessible only to Brooklyn, being some two miles from the steamboat landing.

This summer an ingenious attempt was made to remedy this defect in an easy way. The Brooklyn, Bath & Coney Island Railroad passes along the coast close to what is known as Locust Grove wharf, some 2¼ miles east of its terminus at the middle of Coney Island. At the beginning of the excursion season a track was laid on this wharf to a junction with the railroad, and two steamers began making trips to various piers on the west side of New York city. The passenger gets his cool boat ride through the bay and the Narrows; and with a railroad ride of about 15 minutes is landed at the popular part of the island.

This route has attracted a very fair business this summer, and is much the pleasantest way of reaching the middle of the island from New York. But it is not very widely known yet.

THE NEW YORK & MANHATTAN BEACH RAILROAD.

This is a real estate and hotel as well as a transportation enterprise. While intended, apparently, to give to New York a short route to an entirely respectable sea-side resort, it did not aim to reach the already popular middle island, but established a resort of its own, its own property and so wholly under its control, and designed, apparently, to be not simply respectable but really elegant; not only a place to visit for an afternoon or evening, but a summer residence, where families may reside throughout the summer. When completed it will reach both sides of New York, and pass along the entire eastern border of Brooklyn; and the route it now has from New York includes a pleasant ferry of some five miles across New York bay, as well as a railroad journey.

The New York & Manhattan Beach Railroad then has some striking points of contrast with the three Brooklyn excursion railroads described last week. In the first place it is by far the longest of any, aggregating 19.17 miles of line; secondly, it is of 3-feet gauge instead of 4 ft. 8½ in.; thirdly, it is throughout of more massive and costly construction, passing under highways by tunnels or brick arches instead of using them for right of way.

The general route of this railroad is a semi-circle about 15 miles in length, inclosing within it the greater portion of the city of Brooklyn. The northern end of this semi-circle is on the East River at the Greenpoint terminus of the Twenty-third street and Tenth street ferries from New York. The southern terminus is at Bay Ridge, on New York Bay, where connection is made with steam ferry-boats plying to various piers on the North River, or west side of New York. Six miles southeast from the Greenpoint terminus the line passes through the growing suburb of East New York, which is, for this reason, the eastern terminus of the line, the extension to Greenpoint being still uncompleted. Eleven miles from Greenpoint and four miles from Bay Ridge the line connects with an extension or branch four miles long to "Manhattan Beach," *i. e.*, the eastern half of Coney Island beach, which is the exclusive property of the company. Here it has erected a fine hotel (said to be the largest on the Atlantic coast) and proposes erecting one still larger during the coming year. It will be seen that the line affords facilities for reaching Coney Island beach to considerable populations which had comparatively little before. That this is so is evident from the fact that the line has at once jumped into a very large business, within 30 days of its opening. We have been unable to obtain any exact and definite figures as to the volume of this traffic, and therefore give none. Some of the round figures given us seemed to have an expansiveness inversely as the gauge; but the traffic is undoubtedly most excellent.

The alignment is generally favorable. The sharpest curves are about 10° or 573 feet radius, a limit which is exceeded by every one of its standard-gauge competitors described last week. The maximum grades we were unable to ascertain with any exactness, but judge them to be from 50 to 60 feet per mile, and were so informed. There is a somewhat greater *amount* of heavy grade on this line, however, than on its competitors, owing to the topographical conditions, but this has little effect on the cost of operating. The earthwork at several points is very heavy. The line is thoroughly ballasted on all but a few short stretches, and the rails (40 lbs. per yard) are of steel throughout, with Lorenz safety switches and angle fish-plates. The ties are of chestnut and oak, 6 feet long and of 5 × 6 in. section, as against 7 to 8 feet long and 6 × 6 to 6 × 8 in. section on its broad-gauge competitors. Why this should be so when the load per wheel of engines and cars is, at least, as great on the narrow-gauge line, is one of those inscrutable mysteries which no fellow can find out. It is impossible to give the exact cost of the line, as it is included up to the present with that of the hotel and other property and improvements. The aggregate expenditures have been about $1,000,000.

The rolling stock consists of 5 Mason engines of the Fairlie or double-truck pattern (single boilers), 36 open excursion cars, 4 closed passenger cars and 8 or 10 8-wheel freight cars. The engines have 12 × 16 in. cylinders, 44 in. drivers, 5 ft. 6 in. wheel-base, 96 2-in. tubes 10 feet long, and a 44 × 36 in. firebox. The truck wheels are 24 in. in diameter, the barrel of the boiler 30 in. in diameter, and the total weight of the engine, empty, is 22 tons, or 44,000 lbs. Their cost was $7,000 each. The tender carries about 800 gallons of water and about 2,000 to 3,000 lbs. of coal, making the total weight of the engine, with full boiler and half-loaded tender, about 25 tons, of which about 16 tons is on the drivers, or about 4 tons per wheel. This is from half a ton to a ton more than its standard-gauge competitors having similar gradients, and is the same as on the Prospect Park & Coney Island Railroad with its heavy terminal gradient of 211 feet per mile. One or two heavier engines, however, with 4½ to 5 tons per wheel, have been recently introduced on the latter road, and we judge that the duty imposed on these Mason engines bids fair to justify and require all their load per wheel. All we desire to point out by comparison of these engines is that it is at least as easy to build light engines, well designed and well proportioned, on the broad gauge as on the narrow. This is irresistably evident to any one who sees them working side by side on the railroads we have described.

The excursion cars on the line were all purchased from the railroad at the Centennial Exhibition, and have probably been seen by most of our readers. They are 39 feet long from out to out, by 8 ft. 4 in. in width, as against about 7 ft. 6 in. in width on its broad-gauge rivals. A platform 1 ft. 10 in. wide is taken off at each end of the car, and the remaining space cut up into eight bays, 4 ft. 5 in. long, with two seats facing each other. The seats are 14 in. wide with 20 in. between for the knees of two passengers, as against 22½ in. on the Canarsie & Rockaway Beach Railroad and 16 in. for the knees of one passenger on the other broad-gauge lines. Each seat carries six passengers comfortably, which is hardly the case with the narrower car-bodies of its competitors. The trucks have a 3 ft. 8 in. wheel base, and 24 in. wheels, and are 27 ft. 4 in. from centre to centre, substantially the same as on the broad-gauge lines. The outside sills are 3½×6½, and the four inside sills 3×6½, against 4×9 and 2½×9 on the broad-gauge lines. By what mechanical theory it is made possible to increase the paying load and lighten the sills, widen the car-body and narrow the gauge, at one and the same time, is a conundrum which we must give up at once. A possible explanation is that these cars were built to last through the Centennial and sell off at auction, but they appear to "stand the racket" reasonably well, and the error may easily be in great degree on the other side of the fence. The trucks are framed of 2½×¾ iron instead of the usual 3×1, and have rubber springs under the side bearings—a very wise precaution, as the oscillation is somewhat noticeable, especially with a light load. Except that the roadbed is very superior to that of its broad-gauge rivals, we judge there would be a noticeable difference in this respect where now there is only equality. We have been unable to ascertain the weight and cost of these cars, but judge the former to be a little less than six tons and the latter about $1,500, or a little less than the heavier and narrower cars used on the broad-gauge lines.

The closed cars of the line are duplicates of those furnished by the same builders (Jackson & Sharp Manufacturing Co.) to the Denver & Rio Grande Railway, and already described in these columns. They have a 35 ft. car-body plus 5 ft. for platforms, and are 7 ft. wide from out to out. On one side of the car is a double seat 2 ft. 9 in. wide as against the usual 3 ft. 2 in., and on the other side a single seat, 1 ft. 9 in. wide, with an aisle 17½ in. wide between them, instead of the usual 22 in.,

more or less. They are 3 ft. from rail to floor, instead of the usual 4 ft. to 4 ft. 6 in., as are also the excursion cars and the 8 or 10 platform freight cars in use on the line.

The latter cars are 24 ft. long by 7 ft. 6 in. wide, with 4×12 in. body bolster, and 6×2½ in. transoms, 6 ft. apart, and 1 in. truss rods. The outside sills are 6¼×3¼ in., the four inside sills 5¾×2 and 5¾×2¼ in. Very common—and light—dimensions for sills of broad-gauge cars are 4½×8 in. outside sills and 3×8 in. centre sills, with 20 ft. between trucks. In general design and proportion of details, the narrow-gauge cars are neither better nor worse than their rivals; they are simply reduced copies; and this being so we can determine with great exactness the *relative* safe loads for these cars by mathematical formulæ, although we cannot determine the *absolute* safe load for either. Taking the maximum unsupported span of stringer as 6 and 8 ft. respectively, and comparing the two platforms by the ordinary formula for the strength of beams, viz., that it is in proportion to the breadth × square of depth ÷ span, we find that the *relative* safe loads are as 98.5 to 168, a difference of 70 per cent. in favor of the broad gauge. If we assume in both cases that the sills are unsupported from truck to truck, the resulting ratio is as 37 to 67, or 80 per cent. in favor of the broad gauge. Hence it follows that if the broad-gauge car will only carry 10 tons with safety, the narrow-gauge cars will only carry 5.6 to 5.9 tons; or if the narrow-gauge car will carry 9 tons, then the broad-gauge will carry 15.3 to 16.2 tons. On referring to Fleming's "Narrow-Gauge Railways in America," however, we find these cars figuring as good for 8.8 tons, while with all the formality of tabular comparisons the broad-gauge car is set down as weighing 19,000 lbs., and good for only 10 tons. Here we have another sample of that disingenuous perversion of facts and contempt for or ignorance of mechanical laws which are unfortunately so prevalent in narrow-gauge literature and is alike discreditable to the writer and ridiculous to the well-informed and impartial reader.

With this we leave the New York & Manhattan Beach Railroad. It has an admirable and well-constructed line which apparently supplies a public need; it might have had a very much better and more economical line by laying it down to standard gauge. Any competent engineer will say that the cost of the road-bed would not have been increased *more* than $500 per mile, nor the cost of the cars more than $20 each—for longer axles and bolsters—nor the cost of engines of equal efficiency and economy by any sum whatsoever. It cannot be said in this case that if this *might* be done it never is done, for it actually *is* done by four different standard-gauge lines which this narrow-gauge road successively crosses. Altogether, its difference in gauge has saved the company (including the uncompleted section) about $10,500, the yearly interest on which is $735. To effect this petty saving it has sacrificed the possibility of valuable connections and increased by at least 25 per cent. the cost of maintaining the track to the same "oscillatory standard"—to coin a phrase. This being so, the laying down of a narrow-gauge—nearly always injudicious in our opinion, for reasons many times given—would seem in the case of this line to have been exceptionally unwise, and none the less so because it is still quite possible that the road may be a great success.

THE NEW YORK & SEA BEACH RAILROAD.

We can have little to say of this road, though a part of it is already open and in operation in connection with the Brooklyn, Bath & Coney Island Railroad. The completed part extends from a junction with the last named road two miles from its Brooklyn terminus and but a few feet from the Manhattan Beach crossing directly to the middle of Coney Island between the stations of the Brooklyn, Bath & Coney Island and the Prospect Park & Coney Island roads. It thus has no city or bay terminus, and is as yet wholly dependent on its connection with the Brooklyn, Bath & Coney Island road for its traffic. The latter, however, works in connection with it, as the shorter and straighter route and quicker time of the Prospect Park & Coney Island road have been diverting the traffic from its old road; and it is better for it to get a large traffic over a part of its road than to insist on making passengers go over the whole seven miles of road or go to some rival. The Sea Beach road has not yet, we think, secured any considerable traffic.

Besides the numerous railroads now in operation to Coney Island, there are half a dozen projects for new excursion railroads thither. There is nothing more certain than that either these new lines must fail, or destroy the value of some of the existing roads—and in most cases doubtless the former will be the case, if the roads succeed in getting themselves built. When we remember that none of the existing roads have a double track, it is evident that with comparatively little expense they can be prepared to carry a traffic several times as large as they now have, even on hot Sundays. The enormous traffic developed suddenly by the Prospect Park & Coney Island road seems to have turned the heads of investors and projectors, and there is danger that the business will be overdone.

The Master Mechanics' Association Report.

A circular has just been issued by the Supervisory Committee of the Master Mechanics' Association, announcing that they propose to ask for a contribution from the several railroads represented in the Association to defray the expense of printing the annual reports. Heretofore the whole expense of conducting the Association and printing the reports has been paid from the members' annual dues. This year we learn that, owing to the size and cost of the report, there are not sufficient available funds in the treasury to pay the cost of printing. The reports of the Association have been distributed in the most liberal way, and we believe any general superintendent or other prominent officer who applied for them has received them. Inasmuch as all the advantage accruing therefrom is for the benefit of the railroad companies themselves, it seems reasonable that the small amount required to print the reports should be paid without any question. We doubt whether railroad companies will be able to expend money in any other way for which they will get so much in return.

Record of New Railroad Construction.

This number of the *Railroad Gazette* has information of the laying of track on new railroads as follows:

Menominee River.—The first track is laid from Spaulding, Mich., west to the Breen Mine, 12 miles.

This makes a total of 842 miles of new railroad completed in the United States in 1877, against 1,142 miles reported for the corresponding period in 1876, 594 in 1875, 913 in 1874, 1,966 in 1873 and 3,372 in 1872.

THE PETROLEUM MOVEMENT continued heavy in July, in spite of the strikes, and even more so than for the earlier part of the year, so far as exports indicate. The latter were on the average 6,045,000 gallons weekly from Jan. 1 to June 30, and for the five weeks after June were 7,179,050 gallons per week. The exports for July were 38 per cent. greater this year than last, and the increase at New York was nearly equal to the total increase. It is not true, however, that there has been no interruption to the tendency of New York to absorb the whole business. Baltimore appears to have made great progress in July, exporting twice as much as during the same month last year, and 15 per cent. of the total exports of the month, while for the six months preceding it exported but 10 per cent. of the total, New York meanwhile exporting in July 73 per cent. of the total this year and in the half-year 70 per cent., against 64 per cent. in July and 53 per cent. in the half-year last year. The losses are at Philadelphia, which exported but 13 per cent. of the total in the first half of this year and 11 per cent. in July, against 28 per cent. in the first half and 24 per cent. in July last year. Philadelphia's exports so far appear to continue to decrease, in spite of the great increase in exports. Its average weekly exports this year were 793,760 gallons down to the end of June, and for the next five weeks only 774,444 gallons.

THE ADVANCE IN WATER RATES continues and seems quite remarkable. For corn from Chicago to Buffalo 3½ cents per bushel has been for some days the ordinary quotation, and the canal rate has gone up to 6¼ cents. The average rate in June was 1.9 cents by lake and 4.3 by canal. Thus the advance in lake rates is nearly 100 per cent. from the average of that month, and has been 133⅓ per cent. from the rate of 1½ cents per bushel which prevailed some weeks this season. Both lake and canal rates are now higher than they were a year ago; and the reduction of canal tolls, which for most of the season appeared to result wholly in the benefit of the shipper, now seems to go wholly to the boatman. The water movement is not heavy, but as good at least as it was a year ago, and unless the vessels were absolutely losing money very fast a few weeks ago, their business should be decidedly profitable now. The great crops of the year promise more directly to the lake and canal vessels than to the Eastern railroads; but it is a very inadequate conception of the grain traffic which regards it as affecting chiefly the trunk lines. These very rarely make anything to speak of out of grain traffic while navigation is open; but on the other hand an enormous mileage of Western railroads gets a chief part of its support from grain, and to most of these low water rates are an unmixed good.

THE HARVESTS have so far progressed as to make it certain that the crop of small grains—winter wheat, spring wheat and oats—will be one of the largest and perhaps the largest ever produced in the country. Except in California, there seems to have been nowhere a poor crop. Minnesota, which last year had little to export, is now harvesting an immense crop, and will have it is said something like 25,000,000 bushels or more for export; while Wisconsin, whose wheat crop hardly ever failed until last year, has a good one this year, though not such a superabundance as Minnesota. These are facts of the utmost importance to two of the greatest railroad systems of the Northwest—the Chicago & Northwestern and the Chicago, Milwaukee & St. Paul, whose business suffered immensely from the failure of the spring wheat crop last year. The heavy crop will profit many other roads quite as much, but no others, probably, except some comparatively short ones in Minnesota, suffered so much from the wheat crop failure last year. The lines further south are profited by the usual or nearly the usual corn and livestock movement, which the northern roads get a very small share of.

OCEAN RATES have advanced materially within a week or two, last Tuesday's quotations being 7¼d. to 8d. per bushel for grain from New York to Liverpool by steam, 6s. to 6s. 6d. per quarter by sail to Cork for orders, etc. For some time grain was taken at 4½d. to 5d., and the rate once fell as low as 4d. Then, when lake and canal rates were also lowest, the purely transportation charges (excluding transfer charges, etc.) on a bushel of corn from Chicago to Liverpool were not more than 15 or 16 cents; now they are 26 or 27 cents, the railroads not getting a cent of it. Thus a comparatively slight increase in the grain movement has within a very few weeks forced up the price of water transportation over this route some 70 per cent. But if the railroads while pressed by grain traffic as they may be in a month or so should advance their charges 25 per cent., we would hear the cry of "extortion" from the Red River of the North and the Kansas to the Wabash and Lake Michigan.

MECHANICAL ENGINEERING seems to be in favor in the British Institution of Civil Engineers. Of the recent award of premiums for papers submitted, six of the ten premiums to members and associates were for papers relating to mechanical engineering, among them being Mr. W. W. Beaumont's paper on "The Fracture of Railway Tires," and Mr. Alex. McDonnell's on "The Repairs and Renewals of Locomotives."

CALIFORNIA WHEAT can reach its European market at very low rates, considering the immense distance. Vessels now offer to take wheat from San Francisco to Liverpool for 40 shillings a ton, which is less than 30 cents currency per bushel, and but about the present cost of carrying from Chicago to Liverpool.

THE BELGIAN STATE RAILROADS are to have 400 cars equipped with the Westinghouse brake—the automatic, we believe. Trials were made in Belgium recently which the engineers reported to have resulted favorably to this brake.

NEW PUBLICATIONS.

Knight's American Mechanical Dictionary; being a description of tools, instruments, machines, processes and engineering; history of inventions; general technological vocabulary, and digest of mechanical appliances in science and the arts. By Edward H. Knight, Civil and Mechanical Engineer, etc. Illustrated with 7,500 engravings. New York: Hurd & Houghton. Three volumes, royal octavo, 283 pages.

These volumes the author announces in his preface to be in the "form of a *dictionary*, and not an *encyclopedia*"—the first, he says, "answers directly the questions propounded, the latter is a collection of treatises." Probably the character of the books would be described better by saying that it is about half way between an encyclopedia and a dictionary. It consists of three royal octavo volumes, containing in all 2,831 pages. The publishers say that the work treats of 20,000 subjects; the amount of space devoted to each varying from one or two lines to 21 pages (on sewing machines), which is, we believe, the longest single article in the whole work.

An idea of the character of Mr. Knight's work may be formed if, as the publishers announce, it is known that it "is the result of twenty-five years' application, much of the time having been passed by the author in the United States Patent Office, where he was engaged in editing the 'Patent Office Report,' and classifying patents; and subsequently editing the *Official Gazette*, and systematizing for examination the 20,000 applications for patents which yearly are presented to the office." The book has, owing to this, what might be called a Patent Office character. The sources from which Mr. Knight has drawn his information have, obviously, been almost exclusively those existing in that office, and it is to this cause that its greatest defects are due. All through the three volumes it is obvious that the author has had in his mind the patents which do or might refer to the subject described, and often, we might almost say generally, in his mind these seem to overshadow the subject itself. This is shown by the fact that the articles which refer to those things which have been the subject of many patents are in nearly all cases much longer than those which describe objects of equal or greater importance and complexity. Thus "Railway" has barely two pages with three engravings devoted to it, while "Paper-bag machine" has over twice that amount of space with eleven elaborate engravings. "Pavement" has nearly three pages with over forty engravings of patented wooden-block paving. "Marine steam-engine" has less than one page with one engraving. There are, it is true, separate articles devoted to the different types of marine engines, such as "oscillatory cylinders," "side beam" engines, etc.; but only the space named is devoted to the elucidation of the principles of marine engines. "Ferry boat" has less than half a page, while "Fish-hook" has more than twice as much. Such subjects as churns, fire-arms, mowers, reaping machines, sewing machines, etc., which have been the subjects of many patents, have a great deal of space devoted to them, while such as "bridge," "canal," "dam," "locomotive," "railway," "signal," etc., are described very inadequately in proportion to their importance. All through the work, too, there is a constant reference, not to the practice and experience in the use of things, but to the patents relating to them. Thus in the article on "Car-brake," the brakes which have been patented are described, and not those in use, and finally the reader is told that for further information "the following *patents* may be consulted." Patents are not descriptions of things, but they describe the *ideas* of the inventors, who are apt to be very visionary people, and whose ideas are consequently liable to be very vague and inaccurate. The information given in the volumes before us is evidently very often drawn from such sources. Thus in the article on car wheels, there are engravings of sixteen different kinds of wheels, only one of which is in common use. All the rest are the crude ideas of inventors which never passed the experimental stage, or perhaps never even reached that stage. There is nothing said in the whole article of the fact that car-wheels in this country are made almost exclusively of cast iron with chilled treads, whereas in other countries nearly all of them are made of wrought iron, and have tires either of the same material or of steel. In the article on car springs, all sorts of wild devices which are not used are described, and it would be impossible for any one to tell from the article what kinds of springs are in general use in this country. The illustration of a "freight car" represents a car with *six-wheeled trucks*. With a somewhat intimate knowledge of the cars in use in this country, we do not know of a single freight car in use with six-wheeled trucks. The engraving is obviously copied from a patent specification. The same thing is true of the illustration of refrigerator cars, and of many other objects which might be pointed out.

Most of the historical articles are compilations made apparently in the easiest possible way with very little obvious effort at condensation or attempt to give the largest amount of information in the space which could be devoted to it. All through the three volumes there are evidences of hasty and ill-digested work. In fact, the task which the author laid out for himself was more than any one human being could do, and involved the acquisition of an amount and variety of knowledge for which, unless a whole lifetime were devoted to it exclusively, there would not be sufficient time in the ordinary duration of a life. If Mr. Knight had called his book "edited memoranda of a patent office examiner" it would have de-

scribed it more exactly than the title which he has adopted does. As such, notwithstanding its defects, it it is a very extraordinary piece of work. Any one who will look through its 2,831 pages must be filled with amazement that any one person could in the time which the author devoted to it have acquired even a very superficial knowledge of the great variety of subjects which are there treated. Now while it must in truth be said that much of the work is very imperfectly done, that fact does not imply that it has not great value. Probably there is not an intelligent mechanic, manufacturer or engineer in the country who would fail to extract from this work a great deal of useful information if the book was within reach at all times.

The system of indexing is very convenient. Every subject is indexed alphabetically just as in an ordinary dictionary, but as all know who are accustomed to look up matters from their titles, it is often difficult to know under what title to look for any specific information. To meet this difficulty the author has "grouped under the general title of each science, art, trade or profession a list or *specific* index of every article in the book bearing any relation to the subject in question. The titles of these indexes are in turn grouped on page v., vol. I, so that by a glance one may determine which clew to follow."

The history of inventions is, although extremely imperfect, nevertheless often very interesting.

What the author calls the "technological vocabulary" is also a valuable feature, enabling the reader to trace out the meaning of a term which cannot be found in an ordinary dictionary.

The great value of the book is in the information which it gives, which, although perhaps not exhaustive or comprehensive, is nevertheless arranged in such a form that it can be turned to in a moment and is so condensed that it can be read in a short time. Thus take the two subjects "Aero-steam engine" and "Air engine." A person can turn to these, and in half an hour can get an amount of information which he would be days or weeks in looking up elsewhere.

The book, as has been pointed out, has very great faults, but is nevertheless very valuable, and is an extraordinary piece of work to be done by one man. A complete mechanical dictionary or encyclopedia, like the "history of human error," can perhaps never be written, and therefore books like the ones before us must be judged for what they do contain more than by what they do not. Estimated upon that basis, Mr. Knight's work must be pronounced a very valuable contribution to the literature of mechanical art and science. It is to be regretted, however, that the publishers instead of making Mr. Knight the exclusive author, did not make him more of an editor, with authority to employ experienced experts in the different departments. In this way with less labor a better book could have been produced.

General Railroad News.

PERSONAL.

—An instance of long service on the footboard is found in Mr. Albert Houghton, who has just retired from active service as a locomotive engineer on account of failing health. He began work as a fireman on the Norwich & Worcester in 1841, was promoted to be engineer in 1847, and in 1853 went to the Hartford & New Haven road. For 16 years past he has run the same train, the "owl line" between New Haven and Springfield. He will still remain with the company as storekeeper at Hartford.

—The Detroit *Tribune* says: "J. H. Page, General Passenger Agent of the Grand Rapids & Indiana road, has resigned his position on that road and accepted a similar appointment on a Texas road. He leaves Sept. 1 for his new field of labor."

—Mr. A. B. Safford, a Cairo banker at one time connected with the Cairo & Vincennes road, died suddenly last week, while on a visit to friends in Burlington, Vt.

—Mr. A. J. Smith, Assistant General Passenger Agent of the Cleveland, Columbus, Cincinnati & Indianapolis Railway, has received a commission as Aid-de-Camp to Governor Young, of Ohio, with the rank of Colonel, vice Colonel Brinsmade, resigned.

—Mr. John H. Flynn, Master Mechanic of the Western & Atlantic Railroad, was recently struck in the leg by a chip of iron from a car wheel, and, the wound being neglected, erysipelas set in, causing a dangerous sickness.

—Mr. J. S. Mott has resigned his position as Assistant General Superintendent of the Marquette, Houghton & Ontonagon Railroad, and in consequence of his resignation the office has been abolished.

—Mr. C. Oliver O'Donnell, a prominent merchant of Baltimore, and for many years a director of the Baltimore & Ohio Company, died Aug. 12, at New London, Conn., where he was spending the Summer. He was 55 years old, and had held many public positions in Baltimore. He leaves a fortune estimated at $1,000,000.

—Mr. Chauncey Rose, one of the original projectors of the Terre Haute & Indianapolis Railroad, and for many years its President, died in Terre Haute, Ind., Aug. 13, aged 83 years. He was also largely interested in the Evansville & Crawfordsville, the Evansville, Terre Haute & Chicago, and other Terre Haute enterprises. He retired from active business several years ago on account of increasing age. Mr. Rose had accumulated a large property, much of which he has given for charitable and educational purposes, having founded the Rose Polytechnic Institute at Terre Haute, an orphan asylum in the same city and given largely to other institutions.

THE SCRAP HEAP.

Railroad Manufactures.

The Hinkley Locomotive Works, at Boston, have sold several locomotives to the Galveston, Harrisburg & San Antonio Railroad. Their work has increased so much that they have been obliged to considerably increase their force.

A statement compiled by the *Iron Age* reports that there are 704 blast furnaces in the United States, of which 270 burn charcoal, 208 bituminous coal or coke and 226 anthracite coal. Of these, 87 charcoal, 85 soft coal and 87 anthracite furnaces, 259 in all, are in blast, leaving 445 idle.

The Pittsburgh *Manufacturer* says that there is a hitch in the manufacture of the La Mothe iron cars at McKeesport, the weight of those already made being much greater than was expected.

The works of Jerome Wheelock, at Worcester, Mass., are running over time on several orders for large stationary engines, including one of 80-horse power for the Boston & Lowell Railroad Co.

Arms, Bell & Co., at Youngstown, O., are building an addition to their works, 32 by 56 feet, to be used as a shop for making bridge irons.

The Central Iron Works, at Harrisburg, Pa., are putting in a new 31-inch train of rolls.

The Crowther Furnace, at New Castle, Pa., is in blast, and the Etna Iron Co. has blown in one of its furnaces there.

The Pittsburg *Manufacturer* says: "Some 40 employes of the Westinghouse Air Brake Co. who were on hand the night of the great fire, to assist in protecting the works and saving the property, in case there should be need, have each been presented with a purse of money ranging from $25 to $50. Fortunately, the services of these willing hands were not needed; but the whole transaction illustrates the good feeling existing between the firm and their employes."

The Chicago National Wire Cloth Mill of Evans & Co. has made a reduction of 16⅔ per cent. in prices of locomotive nettings.

A Story with a Moral for Railroad Employers.

A tall, gray-haired gentleman, so runs the story, lately went into one of the branch post offices in a western region of England. He asked some questions relative to the registering of a letter of one of the girls in attendance, and was answered in a manner which he considered exceedingly sharp and rude. He repeated the question, however, not being quite sure that he was not mistaken in his supposition, and he repeated it very mildly. She answered him more rudely than before. He then made some remonstrance, and asked her if she thought that was a proper way to answer an inquiry in a public office. She said she thought that she had been quite civil enough for him. He asked her, with an ominously increasing mildness of manner, if she would favor him with her name. She emphatically declined to do so. He then said he thought he would tell her his name, which, however, she declined to hear, saying that his name was no concern of hers. He calmly replied that he thought it was, for his name was John Manners, and he was the Postmaster-General.—*London Examiner.*

Recent Bridge Bids.

The Chicago *Engineering News* of Aug. 11 says: "Bids were opened at the office of the Engineer of the Chicago, Milwaukee & St. Paul Railway in Milwaukee on the 1st inst. for the construction of an iron railroad bridge to replace the present wood structure at Kilbourne City as follows:

	Plan No. 1.	No. 2.
Kellogg Bridge Co.	$27,841	.....
Detroit Bridge & Iron Works	32,450	.....
Phœnixville Bridge Works	34,400	.....
Baltimore Bridge Co.	37,670	$37,000
American Bridge Co.	37,490	38,530
Keystone Bridge Co.	37,640	36,822
Milwaukee Bridge Co.	39,804	.....

"The bids are exclusive of the masonry work, which is being put in by the company. An award on the proposals will probably not be made for two weeks from the time of opening."

The contract has since been awarded to the Baltimore Bridge Company.

Prices of Rails in Belgium.

Contracts for supplying materials to the Belgian State railroads were let recently at Brussells. The John Cockerill Works offered to supply steel rails in lots of 2,500 tons at $32.73, $32.80, $32.86 and $32.93 per ton. Other works bid $34.70 and $35.28. At the same time iron rails were offered at $25.87, $27.06, $27.26 and $27.44 per ton.

Prices.

The *Engineering and Mining Journal* has information of a contract for 3,000 tons of steel rails of Pennsylvania make to be delivered in Chicago at $47.50 per ton. It quotes steel rails at the mills at $42 to $45; iron, $33 to $36; old rails, $19; scrap, $23; No. 1 foundry pig, $18 to $19; No. 2, $17 to $18; forge, $16 to $17.

Accidents on British Railroads.

The number of persons killed and injured on railways in the United Kingdom in the first three months of the present year, as reported to the Board of Trade, were, according to the figures given in the official return, 1,134, of whom 268 were killed and 866 injured. This casualties are classed as follows: From accidents to trains, rolling stock, permanent way, etc., 5 passengers were killed and 155 injured; 3 servants of companies or contractors were also killed by this class of accidents, and 35 injured. By accidents arising from other causes 25 passengers and 139 servants were killed, and 147 passengers and 470 servants injured; 11 persons were killed and 7 injured while passing over railways at level crossings; 72 trespassers (including suicides) were killed and 30 injured, and of other persons not coming in above classification 13 were killed and 22 injured. These deaths and injuries are exclusive of 9 persons killed and 439 injured during the same period upon the premises of railway companies by accidents in which "the movement of vehicles used exclusively upon railways was not concerned." The number of accidents to the servants of the companies and contractors will, as usual, attract attention, and some idea of the frightful nature of these accidents may be formed by glancing at a table printed with the return in which the injuries received by these unfortunate persons are classified "as far as practicable." From this we learn that 647 servants were injured or killed.

RAILROAD LAW.

Invalidating Railroad Bonds for Usurious Interest.

In the case of the Commissioners of Craven County against the Atlantic & North Carolina Company and others the Supreme Court of North Carolina has just decided as follows:

1. When the Atlantic & North Carolina Railroad Company issued in 1868 to judgment creditors its mortgage bonds bearing 8 per cent. interest at 80 cents on the dollar, the bonds delivered in New York and payable in New York (where there is a statute forbidding a corporation to plead usury), and the company has been regularly paying the agreed interest on the full amount of the bonds. Held: That a stockholder has a right to enjoin the company from the payment of usurious interest.

2. That the company, without special legislative authority, can issue its bonds.

3. That the bonds not being for money loaned and such consideration not being expressed therein, are usurious under the act of 1868.

4. That the bonds having been disposed of at a discount by the maker, are usurious also on that account.

5. That the New York statute does not apply to the contract, it being a North Carolina contract, and the action being in a North Carolina court. The New York statute has no extra-territorial force.

6. That whether the plaintiffs are entitled to have the bonds given in excess of the debt cancelled, and the illegal excess of interest heretofore paid, returned to it, or credited on the principal or future accruing interest, and how far the statute of limitations may be a bar to plaintiff's relief, are questions not presented on the hearing of an interlocutory order.

Garnishment of Employes' Wages.

In Ragland against the Chicago & Alton Company recently the Illinois Supreme Court decided as follows:

The question herein was, whether a railroad company garnisheed for wages of an employe is bound to claim an exemption for the employe as head of a family. On this the court held:

1. That a railroad company should take an interest in the well-being of all its employes, and concede to them and obtain for them all the advantages the law gives them. They are generally poor, and not well informed of their rights, and it would not be in derogation of the higher position occupied by the corporation to save and protect their interests in all cases; especially when this can be done without trouble and expense to the corporation. Such a disposition, when manifested, cannot fail to render the relations existing between employer and employed more agreeable, and, perhaps, more profitable; and this in all cases of employer and employe.

2. A railroad company, when thus garnisheed, holds the wages in trust for the employes, and if it pays over a portion thereof, which is exempt under the garnishment process, the employe can recover the amount from the company.

OLD AND NEW ROADS.

Atchison, Topeka & Santa Fe and Kansas Pacific Pools.

A St. Louis dispatch of Aug. 9 announces that these companies have agreed to form a pool for all local and through freight and passenger business on which they come into competition. This will cover all the Colorado business and a large part of the Kansas business of both lines. Each road is to be allowed 40 per cent. of the gross receipts for working expenses, and the remaining 60 per cent. will be equally divided between the two roads.

Baltimore & Ohio.

The Mount Clare shops at Baltimore, which have been running nine hours a day, were put upon full time Aug. 15.

The Baltimore *Gazette* notes rumors of the retirement of Mr. Garrett from the presidency. One report names Vice-President Keyser as his successor, but another says it is to be some one not now connected with the road. These reports are probably little more than street talk, and it is not likely in any event that a change would be made before the annual meeting. The controlling interest in the stock is divided between three parties, President Garrett himself, the City of Baltimore and the trustees of the Johns Hopkins University.

Central, of New Jersey.

In Newark, N. J., last week, a hearing was had before a justice of the Supreme Court on an appeal made by the Receiver from the assessment on the property of the company and its leased lines by the State Commissioner of Railroad Taxation. At the commencement of the hearing the Court decided that no question would be considered except the justice of the assessment, and but brief arguments were made, most of the time being occupied in taking testimony. Gen. Fitz-John Porter, Assistant to the Receiver, estimated the value of the whole road, including the Long Branch Division, and equipment at $20,571,939, of which $415,000 was for the ferry between New York and Jersey City. Mr. Ashbel Welch's estimate, as an expert, was $22,000,000. Another witness incidentally stated the net earnings of the Long Branch Division last year at $76,681. The Court finally decided to fix the valuation of the Central and branches at $17,129,170.25 and the Long Branch Division at $1,475,414.11, being a reduction from the assessment of nearly $8,000,000 on the Central and $650,000 on the Long Branch road.

Subsequently the case of the other leased lines was taken up and the Court ordered the assessment on the High Bridge road reduced 50 per cent., the Commissioner's valuation being $985,-024.66. The valuation of the Longwood Valley road, part of the same branch, was cut down 50 per cent. from $417,741.97. One expert testified that he did not believe the road was worth anything beyond the value of the ties and rails. The valuation of the South Branch road was reduced from $448,868.87 to $394,488.82.

Chicago, Milwaukee & St. Paul.

A dispatch from La Crosse, Wis., dated Aug. 12, says: "The Secretary of War on Saturday ordered the board of United States engineers, composed of Colonels McComb, Weitzel and Merrill, to assemble forthwith at La Crosse to determine whether the Chicago, Milwaukee & St. Paul Company shall put dams across the heads of the sloughs between Minnesota and the head of Barron's Island, opposite La Crosse, to protect the old channel of the Mississippi River, which has been changed from its former course by the railroad bridge obstructions." There has been much complaint about the channel at La Crosse this summer, and this action of the Secretary of War is in consequence of a request made by a number of citizens of that place.

Chester & Lenoir.

This company has accepted a proposition from citizens of Catawba County, N. C., to grade and trestle the road from Lincolnton to Newton, with the help of the convict labor allowed that company by the State. The distance is about 16 miles, and work will be begun at once.

Chesapeake & Ohio Canal.

The blockade of the canal by the striking boatmen was broken last week under the protection of a regiment of Maryland militia and a number of the men were arrested. Boats are now passing freely, but very few are in motion, as the boatmen still refuse to work at present rates.

Central, of Iowa.

All the counsel concerned in the foreclosure suit have united in a letter expressing their belief in the absolute impartiality of Judge Dillon in the case and his intention to act and decide so as to protect the interests of all parties concerned. The attack made upon him for his action in the case does not seem to be substantiated by any facts yet brought forward, and the delay in the sale of the road resulted from the action of the trustee and not of the Court. As to the appointment of Mr. Price, who is the Judge's father-in-law, as master in the case, the counsel state in their letter that the appointment was recommended by all the parties in interest and was made only on that recommendation. It further appears that Mr. Price's report reflected rather severely on some of the former managers of the road, who are believed to be responsible for the present attack.

Cleveland & Ohio River.

This company has filed articles of incorporation in Ohio for the purpose of building a narrow-gauge railroad from Cleveland nearly due south to the Ohio River at Gallipolis, a distance of about 190 miles. The capital stock is to be $500,000, and the incorporators are Jerome C. Elder, Samuel Hadden, John H. Kelly, James Taylor and Orrin Thacker.

Connecticut Western.

This company, the Newburg, Dutchess & Connecticut and the Rhinebeck & Connecticut have concluded an agreement for maintaining freight rates and for an equitable *pro rata* division of earnings on through freight.

Covington & State Line.

This company has filed articles of incorporation to build a railroad from Covington, Ind., northwest to the Illinois line, about eight miles. The capital stock is fixed at $100,000.

Danbury & Norwalk.

It is proposed to build a branch or extension of this road from Danbury, Conn., northward through New Milford to New Preston, about 20 miles. The extension will probably be built, if at all, by a separate company; it would serve a hilly and not very thickly settled farming country, nearly all of which is already within a few miles of either the Housatonic or the Shepang road. Local accounts say that much interest is taken

in the proposed road and a number of subscriptions have already been promised.

Delaware & Hudson Canal.

It is announced that this company has executed a new mortgage for $10,000,000 covering its mining and other property in Pennsylvania. The $5,000,000 debentures of 1894 are included in the new mortgage, leaving $5,000,000 new bonds to be issued, which are to be used in funding the floating debt, which is stated at about $1,500,000; in paying such of the bonds due Nov. 1, 1877, as may not be renewed by the holders, and in meeting future requirements of the company. The funded debt by the last report was $15,116,000, which the new mortgage will increase to $20,116,000; the capital stock is $20,000,000.

Denver & Rio Grande.

In the United States Circuit Court at Denver, Col., Aug. 10, a complaint was filed by L. H. Meyer, Trustee, against this company and the Union Contract Company. The complaint is in the usual form and asks for an injunction and the appointment of a receiver, pending further proceedings.

Detroit & Bay City.

It is proposed to build a branch from Vassar, Mich., northeast up Cass River to Caro, about 13 miles. It is said that the branch will be built if a reasonable amount can be raised along the line, and $21,000 have already been subscribed.

Dividends.

Dividends have been declared as follows:

Chicago & Alton, 3½ per cent., semi-annual, payable Sept. 4. Transfer books close Aug. 20.

United States Boiling Stock Co., 2 per cent., gold, semi-annual, payable Sept. 1.

The Chicago & Alton drops from 4 to 3½ per cent.

Duxbury & Cohasset.

The towns interested in this road have held a conference and have appointed a committee to see if arrangements can be made to sell their stock to the Old Colony Company, as recommended by the Railroad Commission.

Evansville, Owensboro & Nashville.

The present owners of this road are talking of building an extension from Owensboro, Ky., northward up the Ohio River to a point opposite Rockport, Ind. The object is to connect with the Cincinnati, Rockport & Southwestern road, and the plan includes the extension of that road from Jasper, Ind., to a connection with the Ohio & Mississippi, as well as the completion of the Owensboro road southward to a connection with Nashville.

Foreclosure Sales.

Sales of railroad property under legal process are reported as follows:

Cayuga, sold by the trustees under the first mortgage, July 26, and bought by George C. Morris, of Philadelphia, for $20,000, for account of the bondholders. The road extends from Cayuga, N. Y., to Ithaca, 38 miles; it was originally known as the Cayuga Lake Railroad, was built in 1872, and was sold Aug. 27, 1874, under foreclosure of the second mortgage, the first mortgage for $800,000 remaining on the road. The purchasers will organize a new company, and will, it is said, extend the road from Cayuga northeast 10 miles to Port Byron.

Philadelphia & Chester County, in Philadelphia, Aug. 6, under judgments obtained by contractors and others. Bought in for $100 by Joseph Crawford, Attorney for the judgment creditors. The road was chartered in 1873, to run from Philadelphia to West Chester, but was never finished. The property sold consists of five miles of graded road-bed, some right of way and the franchises.

Harlem Extension.

The proposed temporary lease by the new proprietors to the Central Vermont has fallen through, and possession of the road was formally taken by the Union Trust Company, trustee, Aug. 10, under the late decree of court. A provisional organization of a new company, known as the Bennington & Rutland, has been completed and will take possession at once.

The road is expected to do a very large business during the celebration of the Vermont Centennial at Bennington, when an immense number of passengers will probably be carried to that town. The Central Vermont had made arrangements to sell excursion tickets at low rates and had, we believe, already sold some. Later advices state that an arrangement has been made by which the Central Vermont will run the road till the celebration is over.

Havana, Rantoul & Eastern.

The grading of the extension of this road from Alvin, Ill., to West Lebanon, Ind., is nearly completed and tracklaying was begun at Alvin this week. The ties are all on hand and the iron is arriving.

Illinois Central.

The Land Department reports for July sales of 717.43 acres of land for $5,518.30. Cash collected on land contracts was $10,820.32.

The Traffic Department reports the earnings of the 707 miles of road in Illinois for the month as follows: 1877, $369,629.90; 1876, $380,495.05; decrease, $10,865.15, or 2.9 per cent. The earnings this year were $523 per mile.

Indianapolis, Bloomington & Western.

The final decree of foreclosure was ordered to be entered in the United States Circuit Court at Indianapolis, Aug. 10. The decree appoints John D. Howland and John A. Jones special masters to sell the road, and directs that claims for labor and supplies furnished within six months prior to Dec. 1, 1874, be paid from the surplus, if any, of the proceeds of the sale. The decree granted is for the foreclosure of the first mortgages on the Main Line, of which the Farmers' Loan & Trust Company is trustee, the amount of principal and interest due being specified at $6,240,858 in the decree.

Junction & Breakwater.

Work has been begun on the extension of this road from Lewes, Del., to Rehoboth Beach, a noted camp meeting ground and summer resort. The distance is about six miles and the work light.

Long Island.

On Aug. 13 this company began to run regular trains on the extension of its Brooklyn Central & Jamaica Branch from East New York through Atlantic avenue to Flatbush avenue in Brooklyn. Besides the through trains a large number of short trains are run to accommodate the local travel to East New York.

Marietta & Cincinnati.

Receiver King has issued the following address:

"*To the Employes of the Marietta & Cincinnati Railroad:* Under ordinary circumstances the thanks of the employers are due to the employes for faithful services rendered, but when, as during the recent strike on many other roads, the performance of such service has been attended not only with difficulty, but at the risk of personal injury, and when not one has faltered, not one has been found wanting, not one has violated the confidence reposed in him, nor proved recreant, then, indeed, must those for whom such service has been rendered feel the deep obligations they are under to those who, despite the temptations that have surrounded them, and the inducements that have been held out to them to violate their trust, have proven faithful. Words merely commendatory would fail to express my thanks to you, and to each and every one of you for your noble conduct toward me and the property under my control during the past two weeks. When all have done so well it would be invidious to make distinctions."

Memphis & Little Rock.

A dispatch from Little Rock, Ark., Aug. 13, says: "In the Chancery Court this morning Chancellor Eakin decided in the suit of the Memphis & Little Rock against the Iron Mountain road, that the latter be enjoined from impeding or destroying the use of any part of the track connecting with the road, or interfering with the use of depots, etc., by the former road. The Memphis road is required to give bond of $5,000 within twenty days for the payment of tolls, etc."

Menominee River.

Track on this road is now laid from the junction with the Chicago & Northwestern at Spaulding, Mich., 22 miles southwest from Escanaba, westward about 12 miles to the Breen Mine. The track is being put in order and ore trains will begin to run very soon. The road is built by a separate company, but is owned by the Chicago & Northwestern, and will be worked as a branch of that road. It is to be extended this season some eight miles further to the Brietung and Quinesee mines in the Menominee iron range.

Missouri, Kansas & Texas.

The amount due under the agreement on the coupons of Aug. 1 was not paid by the Union Trust Company, the Trustee under the agreement. In explanation of this default, the Trustee makes the following statement:

"In the complicated relations of connecting railways arising out of the movement of through passengers and freight, payments are necessarily made to or by one of the companies for account of the other, thus unavoidably creating a debt from one to the other which can only be adjusted at fixed intervals, but which, between solvent roads, is treated as a trust obligation, as it in fact is, of a nature differing from and superior to any other claim—a view which the courts have heretofore recognized by directing payments of such debt by receivers when companies have come under their control through foreclosure proceedings. After repeated and fruitless efforts to obtain payment of the balances due from the Texas Central Company, a proposition was finally made by them in December, 1876, to give their notes in settlement of the amount then due, with the assurance that they would be paid at maturity, and that prompt payment of interchange balances should thereafter be regularly made. The Trustee had to choose between a resort at once to legal proceedings, which was deprecated by those most interested in the securities of the Missouri, Kansas & Texas Company, as tending to destroy friendly and profitable relations for the future, or to make some concession. With the approval of its advisory board, it agreed to accept the notes, not however in payment, but to be held as collateral to the debt, and credited when paid or negotiated. Of the notes $80,000 were paid and $40,000 sold, and the traffic interchanges for January paid in February. On March, however, the Houston & Texas Central Company allowed one of its notes to go to protest, upon which suits were brought for the whole debt, which are still pending, and ultimate success in obtaining the money is confidently anticipated. Pending the result, however, the Trustee is not in funds to meet the amount due on the August coupons at maturity, and payment must therefore be deferred until the receipts from traffic supply the means, which it is hoped will not involve delay beyond Nov. 1, 1877."

Montclair & Greenwood Lake.

An appeal of this company from the valuation of $943,000 put upon the property by the New Jersey Commissioner of Railroad Taxation was heard last week at Newark, N. J., before a justice of the Supreme Court, as provided by law. The company claimed that the valuation should be $421,000 being the cost to the present company, $200,000 paid for the property at foreclosure sale and $221,000 since expended on it. The Court took as a standard the price put upon it by the company, which had issued $628,000 bonds at 85, and reduced the assessment to $595,000.

Nashville, Chattanooga & St. Louis.

A new issue of bonds by this company is now being offered for sale by the banking firm of Aug. J. Brown & Son, of New York. This issue was made to the Memphis & Charleston Company in payment for the stock of the McMinnville & Manchester and the Winchester & Alabama railroads, and amounts to $315,000, or about $4,200 per mile. They are secured by a first mortgage on the two roads named, 75 miles in all, and bear 6 per cent. interest from Jan. 1, 1878. The bonds are now held by the Memphis & Charleston Company, and are offered for sale for its account at 75. They have 40 years to run.

Nova Scotia, Nictaux & Atlantic Central.

Work on the Atlantic end of this road was begun at Lunenburg, N. S., last week, the first sod being turned with much ceremony by the contractors. Speeches were made by several persons connected with the road.

Pennsylvania.

This company has made arrangements to run a ferry from its depot in Jersey City to a landing near the Fulton Ferry in Brooklyn. At present boats are running to connect with the through trains, but it is said that a more extended service will be given, if the present arrangement proves to be profitable.

A small local strike occurred Aug. 13 on the Philadelphia & Erie Division, at Erie, where a number of the freight men left work in consequence of the discharge of a conductor. The men were discharged and their places promptly filled. They made no attempt to stop trains, but four of them were subsequently arrested for inciting a strike.

Philadelphia & Reading.

The bridge over the Schuylkill at Reading, Pa., on the Lebanon Valley Branch, which was burned during the late strike, has been replaced by a temporary trestle work and the connection with the main line re-established.

Pittsburgh, Wheeling & Kentucky.

Ohio County, West Va., voted last week in favor of the proposition to take $50,000 bonds of this company, in which the county has already a large sum invested. Brooke County voted against a similar proposition, but it is thought that the vote of Ohio County will secure the completion of the road.

Proposed Railroad Conference.

Mr. M. E. Ingalls, Receiver of the Indianapolis, Cincinnati & Lafayette, has addressed a circular letter to the officers of the principal railroad companies of the United States, asking for a general consultation with a view of arranging for a uniform advance in rates of all kinds, especially in freight transportation, and suggesting Cincinnati as the place of meeting.

Shenandoah Valley.

It is stated that a New York contracting firm has made a proposition to complete this road, provided all outstanding claims against the company can be funded in income bonds. The liabilities of the company are said to be about $500,000, the principal creditor being the Central Improvement Company, the original contractor for the road.

Southbridge & Brookfield.

It is decided to make East Brookfield Station, on the Boston & Albany, the terminus of this projected road, and also to adopt the line run on the west side of the Podunk ponds. A much larger amount of subscriptions was promised for this line than for that to West Brookfield. The line from Southbridge northward to East Brookfield is about 13 miles, and it is also proposed to build a short spur to accommodate some large brick yards near the line. About $75,000 in subscriptions are already promised.

St. Croix & Penobscot.

Another election was held in Calais, Me., Aug. 13, on the question of a city subscription in aid of the extension of this road to a connection with the European & North American. The vote stood 920 in favor of the subscription to 60 against. The amount required from the city will be about $90,000.

St. Louis, Iron Mountain & Southern.

In the United States Circuit Court in St. Louis, Aug. 9, the former bill in foreclosure filed by the Union Trust Company, of New York, trustee, was dismissed without prejudice by request of counsel for the trustee. A new bill asking for a foreclosure and the appointment of a receiver was then filed. It is similar to the old bill, alleging default in payment of interest, but is amended so as to include later defaults, especially that of Aug. 1 on the St. Louis & Iron Mountain first-mortgage bonds.

St. Paul & Pacific.

The St. Paul *Pioneer-Press* of Aug. 8 says: "The long-expected news was received yesterday by Manager Farley, of the St. Paul & Pacific Railroad, that the means necessary for constructing the Glyndon cut-off had been provided, and he was instructed to proceed at once with the work. Mr. Farley is equal to the emergency, and the advance guard of railroad builders will proceed to-day to the scene of operations, and as soon as the preliminary steps can be taken the work will be carried forward to early completion.

"The construction of this short branch will not only close a gap in the railroad system of Northwestern Minnesota, but it will certainly expedite the completion of the St. Vincent branch of the St. Paul & Pacific Railroad. * * *

"Articles of incorporation of the Red River and Manitoba Railroad Company, which it is expected will build the St. Vincent Branch, were filed for record in the office of the Register of Deeds in St. Paul yesterday. The object of the company is to build and operate a line of railroad from Breckenridge to St. Vincent, on the Red River of the North. The capital stock is fixed at $500,000 in 5,000 shares at $100 per share. The corporators are: John S. Kennedy and Walter G. Oakman, of New York; John S. Barnes, of New Jersey, and Samuel J. Beals and William H. Fisher, of St. Paul."

Toledo, Peoria & Warsaw.

The Receiver's report for June and July is as follows:

Balance, June 1		$15,940 99
June receipts		119,399 09
July receipts		106,280 81
Total		$241,620 89
June disbursements	$126,072 61	
July disbursements	114,466 79	
		240,529 40
Balance, Aug. 1		$1,091 49

The disbursements exceeded the receipts by $6,663.52 for June; by $8,185.98 for July and by $14,849.50 for the two months.

Waynesburg & Washington.

The grading on this road is being rapidly finished up and tracklaying has been begun. The iron is all on hand and the company expects to have the road completed this fall.

ANNUAL REPORTS.

Chicago & Northwestern.

The roads worked by this company during the fiscal year ending May 21, 1877, was as follows:

	Miles.
Chicago & Northwestern and branches (consolidated)	1,060.50
Chicago & Milwaukee (owned but not consolidated)	85.00
Chicago, Iowa & Nebraska and Cedar Rapids & Missouri River (Clinton, Ia., to Council Bluffs), leased perpetually	356.60
Total Chicago & Northwestern proper	1,502.10
Proprietary roads:	
Winona & St. Peter, Winona, Minn., to Lake Kampeska, Dak.	327.00
Winona, Mankato & New Ulm, Junction to Mankato	3.75
La Crosse, Trempeleau & Prescott, Winona Junction, Wis., to Winona, Minn.	29.00
Iowa Midland, Lyons, Ia., to Anamosa	68.80
Northwestern Union, Milwaukee to Fond du Lac Junction	62 63
	491.18
Total	1,993.28

There was an increase from the previous year of 1.20 miles in the mileage owned, by the building of a branch of that length from the Peninsula Division to the Bessemer Mine.

The equipment of the whole system consists of 369 engines; 2 parlor, 149 first and 29 second-class passenger, 15 mail and 67 baggage and express cars; 5,166 box, 504 stock, 1,158 platform, 1,957 iron ore and 142 caboose and way cars; 4 paymasters' and officers', 18 boarding, 26 dump, 40 ditching and 12 pile-driving and wrecking cars, a total of 262 passenger-train, 8,927 freight and 100 service cars. Of this equipment the title to 27 engines 7 passenger and 2 baggage cars, 893 box, 133 platform and 2 caboose cars is in the Winona & St. Peter Company.

The company has a land grant in Michigan, Wisconsin, Minnesota and Dakota, of which 2,153,074.99 acres remained unsold at the close of the year. Patents were obtained for 11,937.64 acres during the year. The sales were not large, being 13,276.96 acres in Michigan, 3,202.75 acres in Wisconsin and 2,073.57 acres in Minnesota and Dakota, in all 18,553.28 acres for $62,204.52. The sales in Michigan were chiefly of timber lands. A land office was opened at Marshall, Minn., in September, and promises to add to the sales in that State.

The general account at the close of the year was as follows:

Common stock (deducting $114,121.99 owned by Co.)		$14,989,023.98
Preferred stock (deducting $220,531.84 owned by Co.)		21,475,802 72
Total stock ($31,833 per mile owned)		$36,464,826 70
Chicago & Northwestern currency bonds	$12,900,000	
" " gold bonds	17,193,000	
Chicago & Milwaukee bonds	1,700,000	
		31,793,000 00
Real-estate mortgages		236,250 00
Floating debts, less floating assets		103,450 71
Income account, balance at close of year		4,358,745 80
Total		$72,956,273 21
Construction and equipment accounts	$68,713,559 44	
Proprietary roads	2,346,379 21	
General assets, stocks, bonds, etc.	779,891 17	
Materials and fuel on hand	1,116,443 39	
		$72,956,273 21

The funded debt is $27,755 per mile of road owned. It was increased during the year by $760,000 gold bonds. A summary of the balance sheets of the proprietary roads is as follows:

	Stock.	Bonds.	Due C. & N. W. Co. for advances.	Total.
Winona & St. Peter	$410,030	$8,775,000	$1,385,905	$10,570,935
Winona, Mankato & New Ulm	100,000	.....	72,409	172,409
La Crosse, Trem. & Prescott	2,500	1,000,000	446,915	1,449,415
Iowa Midland	44,948	1,350,000	91,414	1,486,362
Northwestern Union	.....	3,500,000	106,838	3,606,838
Totals	$557,478	$14,625,000	$2,103,481	$17,285,95

The total interest charge is $2,224,315 upon the company's own bonds and $1,067,250 on those of the proprietary roads, being $3,291,565 in all, as the debt stood at the close of the year. The company holds, we believe, all the stock of the proprietary roads and guarantees their bonds.

The traffic of the entire system of 1,993.28 miles was as follows:

	1876-77.	1875-76.	Inc. or Dec.	P. c
Train mileage, pass.....	2,632,981	2,573,777	Inc.. 59,204	2 3
" " freight..	4,427,605	4,636,517	Dec.. 208,912	4.5
" " service..	655,346	717,991	Dec.. 62,645	8.7
" " swi ch'g	1,915,172	1,992,870	Dec.. 77,698	3.9
Total.....	9,631,104	9,921,155	Dec.. 290,051	2.9
Passeneger car mileage	11,742,209	.....	.....	...
Freight car mileage	91,145,205	.....	.....	...
Passengers carried.....	3,347,853	3,527,143	Dec.. 179,290	5.1
Passenger mileage	116,902,435	122,281,308	Dec.. 5,378,873	4.4
Tons freight carried....	3,413,398	3 471,927	Dec.. 58,529	1.7
Tonnage mileage	495,357,900	503,132,389	Dec..17,774.489	3.5
Av. pass. train load, No.	44.40	47.50	Dec.. 3.10	6.5
Av. freight train load, tons.....	109.62	108.50	Inc .. 1.12	1.0
Av. receipt per train mile.....	$1.4520	.....	.....	...
Av. cost per train mile	0.8385	.....	.....	...
Av. net " " "	0.6135	.....	.....	...
Av. receipt per pass. per mile	2.89 cts.	2.85 cts.	Inc .. 0.04 ct.	1.4
Av. receipt per ton per mile....	1.86 "	1.95 "	Dec.. 0.09 "	4.6

The average passenger trip was 34.92 miles, the average freight haul 142.19 miles, against 34.67 and 144.91 miles the previous year.

The earnings of the Chicago & Northwestern proper (1,502.10 miles) for the year were:

	1876-77.	1875-76.	Inc. or Dec.	P. c.
Passengers ...	$3,018,622 79	$3,145,749 63	Dec..$127,126 84	4.0
Freight	8,261,583 72	9,001,177 95	Dec.. 739,594 23	8.2
Express.....	246,908 36	262,253 83	Dec.. 15,345 47	5.9
Mail.....	284,792 38	289,182 98	Dec.. 4,390 60	1.5
Miscellaneous.	65,592 78	75,346 96	Dec.. 9,754 18	13 0
Total...$11,877,500 03	$12,773,711 35	Dec..$856,211 32	7.0
Operating expenses.....	6,236,688 23	7,074,617 95	Dec.. 837,929 72	11.8
Taxes.....	310,991 83	327,546 90	Dec.. 16,555 07	5.1
Chicago fire losses.....	.....	6,693 14	Dec.. 6,693 14	100.0
Total... $6,547,680 06	$7,408,857 99	Dec..$861,177 93	11.6
Net earnings.	$5,329,819 97	$5,364,853 36	Dec.. $35,033 39	0.7
Gross earn. per mile....	7,907 26	8,510 00	Dec.. 602 74	7.1
Net earn. per mile... ...	3,548 24	3,574 00	Dec.. 25 76	0.7
Per cent. op. expenses...	52.51	55.38	Dec.. 2.87	5.2
Per cent. exps. and taxes...	55.13	58.00	Dec.. 2.87	4.9

The earnings of the whole system of $1,993.28 miles were:

	1876-77.	1875-76.	Decrease.	P. c.
Gross earnings.....	$13,033,101 96	$14 013,731 97	$980,630 01	7.0
Expenses and taxes..	7,526,100 92	8,274.289 90	748,188 98	9.0
Net earnings.....	$5,507,001 04	$5,739,442 07	$232,441 03	4.0
Gross earn. per mile.	6 538 52	7,035 00	496 48	7.1
Net earn. per mile..	2,762 78	2,881 00	118 22	4.1
Per cent. of exps....	57.75	59.04	1.29	2 2

The gross earnings and earnings per mile of the several proprietary roads were:

	Gross earnings 1876-77.	Gross earnings 1875-76.	Per mile. 1876-77.	Per mile. 1875-76.
Winona & St. Peter.....	$573,666 01	$626,965 83	$1,754	$1,917
Winona, Mankato & New Ulm.....	3,604 49	4,187 18	961	1,117
La Crosse, Trem. & Prescott.....	208,656 80	231,966 95	7,195	7,999
North western Union	269,657 56	268,534 03	4,306	4,283
Iowa Midland..	100,017 07	108,366 63	1,451	1,535
Total.....	$1,155,601 93	$1,240,020 62	$2,353	$2,524
Expenses.....	978,420 86	865,431 91	1,992	1,760
Net earnings.....	$177,181 07	$374,588 71	$361	$764

The expenses of the Chicago & Northwestern proper are given in detail in the following table:

	Year ending May 31, 1876.	Year ending May 31, 1877.	Inc. or Dec.	P. c.
Repairs of engines and tenders.....	$533,747 21	$437,547 42	Dec.. $96,199 79	18.0
Repairs of cars..	636,934 83	517,335 25	Dec.. 119,509 58	18.9
Repairs of buildings....	132,918 09	91,296 63	Dec.. 41,621 46	31.3
Repairs of fences, g tes and crossings.....	61,753 73	63,377 20	Inc .. 1,623 47	2.6
kep'rs of bridges and culverts..	150,286 76	186,492 57	Inc .. 36,205 81	24.1
Repairs of track.	1,412,579 61	1,260,443 35	Dec.. 152,136 26	17.8
Repairs of tools, and machinery.	101,712 76	84,394 85	Dec.. 17,317 91	17.0
Fuel used by locomotives....	911,833 54	738,564 40	Dec.. 173,269 14	19.0
Fuel and lights used in cars and at stations.....	122,047 19	95,977 77	Dec.. 26,069 42	21.4
Oil, waste and tallow used....	94,538 69	76,129 73	Dec.. 18,408 96	19.4
Office and station furniture and expenses.....	46,814 33	47,666 04	Inc .. 851 71	1.8
Furniture and fixtures for cars	12,019 71	14,268 18	Inc .. 2,248 47	18.7
Foreign agents..	56,788 47	53,004 30	Dec.. 3,784 17	7.1
Advertis ng.....	18,092 16	20,004 39	Inc .. 1,912 23	10.6
Station'ry, printed blanks, tickets, &c.....	43,098 65	41,911 46	Dec.. 1,187 19	2.8
Enginemen, firemen and wip'rs	667,076 25	626,047 75	Dec.. 41,028 50	6.0
Conductors, baggagemen and brakemen.....	413,032 31	393,091 80	Dec.. 19,940 51	4.8
Laborers and switchmen at stations.....	658,524 61	615,223 68	Dec.. 43,300 93	6.6
Agents and cl'rks at stations....	615,154 09	580,484 79	Dec.. 34,669 30	5.8
Superintendence	102,788 83	83,540 06	Dec.. 19,248 77	18.7
Rents.....	23,967 78	17,978 04	Dec.. 5,989 74	24.9
Loss and damage	47,473 34	30,130 43	Dec.. 17,342 91	36.5
Injury to persons.....	71,486 73	68,067 84	Dec.. 3,418 89	4.8
Teaming freight, baggage and mails.....	6,003 53	5,888 27	Dec.. 115 26	1.9
Miscella n e o u s expenses	68,273 06	53,484 91	Dec.. 14,788 15	21.7
Car hire paid over amount received.....	65,671 69	34,337 12	Dec.. 31,334 57	47.8
Total.....$7,074,617 95	$6,236,688 23	Dec..$837,929 72	11.8
Add losses, &c., acct. Chicago fire	6,693 14	.....	Dec.. 6,693 14	100.0
Taxes.....	327,546 90	310,991 83	Dec.. 16,525 07	5.0
Total.....$7,408,857 99	$6,547,680 06	Dec..$861,177 93	11.7

The net result of the year's operations was as follows:

Net earnings, Chicago & Northwestern.....		$5,329,819 97
Interest, sinking f nd and premium.....	$2,386,774 54	
Balance, tax on capital stock, 1874.....	14,515 19	
Exchange old Galena & Chicago Union stock.....	557 82	
Rentals of Iowa Division.....	1,092,954 19	
		3,494,801 74
Balance.....		$1,835,018 23
Interest an i premium, bonds of proprietary roads.....	$933,973 03	
Less net earnings of those roads.....	177,181 07	
		756,791 96
Net profits for the year.....		$1,078,226 27

The general account of receipts and the disposition thereof is as follows:

RESOURCES.

Cash on hand May 31, 1876.....	$910,598 53
Gross earnings of all roads	13,033,101 96
From sale of consolidated gold bonds, securities, stock and land-grant lands	786,998 66
Used of material and fuel on hand May 31, 1876	210,532 44
Total.....	$14,941,231 59

DISBURSEMENTS, CASH AND ASSETS.

Operating expenses and rental whole r ad.....		$8,619,055 11
Interest on b nds, gold premium, etc.....		3,485,146 60
Div dend on preferred stock		536,810 00
Dividends, etc., in exchange of old G. & C. U. R. R. stock.....		557 82
Construction and equipment C. & N. W. Railway.....	$543,962 76	
Construction on proprietary roads.....	183,079 04	
		727,041 80
Reduction of unfunded debt and land notes		639,651 09
Increase in sundry assets.....		100,558 06
Cash on hand May 31, 1877.....		832,411 11
Total.....		$14,941,231 59

President Keep's report gives the following statements:

"The net result of the operations of the Chicago & Northwestern Railway Company, including the operations of its proprietary roads, shows a profit of $1,078,226.27 for the last fiscal year, from which a dividend of 2¼ per cent., amounting to $536,810, was paid to the preferred shareholders in December last.

"The balance of profits, amounting to $541,416.27, is a little in excess of the December dividend; but in view of the diminished volume of business which characterized the last half of the fiscal year, and the comparatively light traffic which must continue until the transportation of the new crop is reached, no further dividend for the year is recommended or deemed consistent with a conservative administration of the affairs of the company. * * *

"The total charges have been reduced on the entire railway, including the proprietary lines, from $12,834,015.08 in the preceding year, to $11,954,875.69 in the last year, thus accomplishing a saving to the company of $879,139.39. * *

"The condition of the property in all its departments, under the rigid economies of the last year, has been fully kept up, and preserved against depreciation and decay. The track, and especially that upon the great main thoroughfares of the company's lines, and the rolling stock, are in exceptionally good order, and will justify comparison with other first class roads. The operating expenses for five years previous to the last fiscal year averaged $7,551,059.99 per year, and for the last fiscal year they were $6,236,688.23, being a decrease of $1,314,371.76 below such average.

"The percentage of operating expenses, taxes, etc., to gross earnings, was 58 per cent. for the Chicago & Northwestern, and 59 $\frac{1}{100}$ per cent. for the combined property for the fiscal year of 1875-6, while for the last year, with its decreased revenue, they were 55 $\frac{13}{100}$ per cent., and 57 $\frac{75}{100}$ per cent. respectively. The entire force of the company, including all classes of officers and employes, has been reduced 1,009 during the year, the average number employed being 7,866 persons, equivalent to 3 $\frac{95}{100}$ for each mile of road. * *

"The car equipment has been increased by two new parlor cars for passenger trains, and 50 live stock freight cars during the year, and the amount expended for these additions and the Westinghouse brake, etc., was $61,522.81. The principal renewals were the rebuilding of seven first-class passenger cars, three second class cars, two baggage and 103 freight cars, besides the renewal of 7,038 car wheels and axles. Nine locomotives were rebuilt in the company's shops, five of which were reconstructed for the burning of coal."

A number of minor improvements in bridges and stations were made. The material used in renewals of track was 13,546 tons steel rails, 500 tons rerolled iron rails and 720,195 ties; 16,549 rails were repaired and relaid. There are now 574.92 miles of steel track on the Northwestern and 17.01 miles on the other lines, of which 151.73 miles were laid last year. About 160 miles of steel rails are yet to be delivered under existing contracts.

The President further says:

"Soon after the annual meeting in June, at the beginning of the last fiscal year, measures were consummated to pay off the residue of the old floating debt, which had been incurred in the construction of roads projected prior to 1873, and for subsequent construction expenses, steel rails, etc., and $760,000 of the general consolidated gold bonds were sold for this object. The proceeds were used for the extinguishment of $639,651.09 of floating debt and real estate notes, and the balance was applied on construction account during the year. * * * *

"For the accommodation of the ore traffic, the company made large expenditures in former years in the erection of two immense docks, with pockets for the reception of iron ore, situated on the bay at Escanaba, and one storage dock, and in the improvement of the excellent harbor at that point for the shipment of ore. In addition to these outlays, there are 1,957 ore cars, with their necessary complement of locomotives allotted to this special traffic. It is regarded as of much importance that these facilities, so especially provided, should be fully employed during the season of navigation on the Lakes. The prime necessity of obtaining ores of suitable quality at the lowest possible price has led to the critical examination of deposits in the so-called Menominee District, situated from 30 to 50 miles west of Escanaba, and it is claimed that rich ores of great purity are found in abundance, capable of being mined at the very lowest cost.

"A branch road of about 25 miles, called the Menominee River Railroad, is constructing from a point on our line 22 miles west of Escanaba, to open up this new mining region. This branch will be equipped with the ore equipment of this company, and operated in its interest. * *

"By a mutually advantageous agreement with the Green Bay & Minnesota Railway Company in Wisconsin, to whom we have given contracts for the joint use of our track on the La Crosse, Trempeleau & Prescott Rail road, we have secured a permanent arrangement of a reciprocal nature, for the joint use of their branch, extending from Onalaska, on the La Crosse, Trempeleau & Prescott Rail road, into the city of La Crosse.

"The latter road and our Madison Extension were formerly about three miles away from La Crosse at their point of junction, and were precluded from sharing any portion of its business. This difficulty is now overcome by a reciprocal contract for the right of trackage, without any expenditure of capital by this company for the object."

The company has also agreed to lease and work as a branch the Maple River road, now under construction by the Iowa Railroad Land Company. The rental is to be dependent on the traffic, the minimum amount being fixed at $400 and the maximum at $1,350 per mile per year.

Referring to the Supreme Court decision in the Granger cases, the President says:

"Under these decisions, our charters in Wisconsin, Michigan and Minnesota are held to be subject to the reserved power of the legislatures, while our charters in Illinois and Iowa (excepting the Iowa Midland), being grants without reservation or limitation would be regarded as inviolable contracts. In Iowa this exemption is neutralized on our lines by the laws which regulate rates on competing roads whose charters are subject to legislative control.

"As a large portion of the business of our lines is inter-State—the traffic seeking an outlet at Chicago, or passing through the State of Illinois, where our charter is unrestricted—it is apparent that no State can regulate the rates on such business.

"But the question now definitely settled by the Court has, for the most part, become of little practical moment, the States whose acts gave rise to this legislation having repealed their onerous laws, excepting the State of Iowa, where biennial sessions of its Legislature have no doubt longer delayed similar action."

Rutland.

This company owns a line from Bellows Falls, Vt., northwest through Rutland to Burlington, 120 miles; it leases the Addison road, from Leicester Junction to Ticonderoga, 16 miles, and until recently leased also the Vermont Valley road, from Brattleboro to Bellows Falls, 24 miles. The whole property is leased to the Central Vermont Company, and the report for the year ending June 30, 1877, relates only to the financial affairs of the company.

The general account is as follows:

Preferred stock		$4,143,500 00
Common stock.....		2,480,600 00
Total stock ($55,208 per mile).....		$6,624,100 00
Bonds ($20,833 per mile).....		2,500,000 00
Dividend scrip.....		248,131 68
Coupons unclaimed.....		3,647 00
Rents.....		24,000 00
Bills payable, cash, etc.....		250,768 06
Total ($80,422 per mile)		$9,650,646 74
Road and real estate ($76,575 per mile).....	$9,189,046 74	
Addison R. R. stock.....	218,100 00	
Mortgage bonds on hand.....	232,000 00	
Rents due and unpaid.....	11,500 00	
		9,650,646 74

The rent for the Rutland and leased lines for the year has been paid, except the rent for the Vermont Valley road, which was paid up to October, 1876, after which time, by the decree of the United States Circuit Court, the Rutland Company was no longer entitled to receive it. The income account was as follows:

Rents of road.....		$330,000 00
Rent of real estate.....		1,894 00
Interest on receivables.....		12,586 78
Total receipts.....		$344,480 78
Coupons and interest paid.....	$202,175 81	
Rutland & Burlington bonds paid.....	3,100 00	
Rents paid on leased roads.....	77,500 00	
Floating debt paid	45,000 00	
Salaries and office expenses.....	10 338 86	
Legal expenses.....	3,489 21	
		341,603 88
Balance, cash.....		$2,876 90

By agreement the rental of the Addison road has been reduced from 7 per cent. on the stock to 3 per cent., making a saving of $20,000 per year. In making this reduction the old claim of $102,000, received from the Central Vermont in the settlement of last year, was used.

Chicago & Michigan Lake Shore.

This company owns a line from New Buffalo, Mich., northward to Pentwater, 170 miles, with branches from Holland to Grand Rapids, 24.5 miles, and from Muskegon to Big Rapids, 50.5 miles, making 250 miles in all. It is equipped with 26 engines; 12 passenger and 9 baggage cars; 587 freight and 9 service cars. The report is for the year ending Dec. 31, 1876.

The stock is $1,485,200, or $6,062 per mile; the bonded debt $6,630,000, or $27,061 per mile. Interest is in default on all the bonds except on $477,000 first-mortgage bonds.

The work done was as follows:

	1876.	1875.	Decrease.	P. c.
Train mileage.....	404,874	493,860	88,976	18.0
Passenger mileage.....	6,981,054	8,292,294	1,311.240	15.8
Tonnage mileage.....	14,042.374	....	....	....

The earnings for the year were:

	1876.	1875.	Inc. or Dec.	P. c.
Passengers.....	$210,701 14	$232,216 60	Dec..$21,515 46	9.3
Freight.....	322,062 58	354,573 86	Dec.. 32,511 28	9.2
Mail, express, etc.....	34,052 59	35,664 31	Dec.. 1,611 72	4.5
Total.....	$566,816 31	$622,454 77	Dec..$55,638 46	8.9
Expenses.....	487,648 78	552,546 48	Dec.. 64,897 70	11.7
Net earnings.....	$79,167 53	$69,908 29	Inc .. $9,259 24	13.2
Gross earn. per mile..	2,313 54	2,540 63	Dec.. 227 09	8.9
Net earn. per mile....	323 13	285 34	Inc .. 37 79	13.2
Per cent. of expenses.	86.00	88.77	Dec.. 2.77	3.1

Interest amounting to $47,440 was paid on the first-mortgage bonds. The report says: "The receipts from passenger business between Jan. 1 and Nov. 11, 1876, fell off 7.31 per cent., as compared with the corresponding period of 1875, on a gross sum of $197,074; while the freights during the same time fell off 5.71 per cent. on $306,081, chiefly on the carriage of forest products.

"In view of these facts and of the rapid increase of the company's defaulted interest account, on the 11th of November the road was placed in the hands of Mr. George C. Kimball, its former General Manager, as Receiver. As regards a reorganization of the company, there seems to be but one judicious course to pursue. The different portions of the road are covered by separate and distinct mortgages, which, as we are advised, in some cases partially overlap each other. The property can, however, hardly be made of value except as a whole, nor would the present net earnings of any portion of it suffice to pay interest on any new mortgage debt. It only remains, therefore, to foreclose all the mortgages at once, excepting the small first mortgage of $477,000, which is sufficiently secured, and to convert them into one equal non-interest-bearing security. This can be effected with little trouble and delay through the usual process of foreclosure and sale, followed by a subsequent reorganization and the issue of stock to represent the old bonded indebtedness with the arrears of interest thereon. Upon this, dividends (however small) can be paid whenever they are earned."